FOOD ENGINEERING

January 1952

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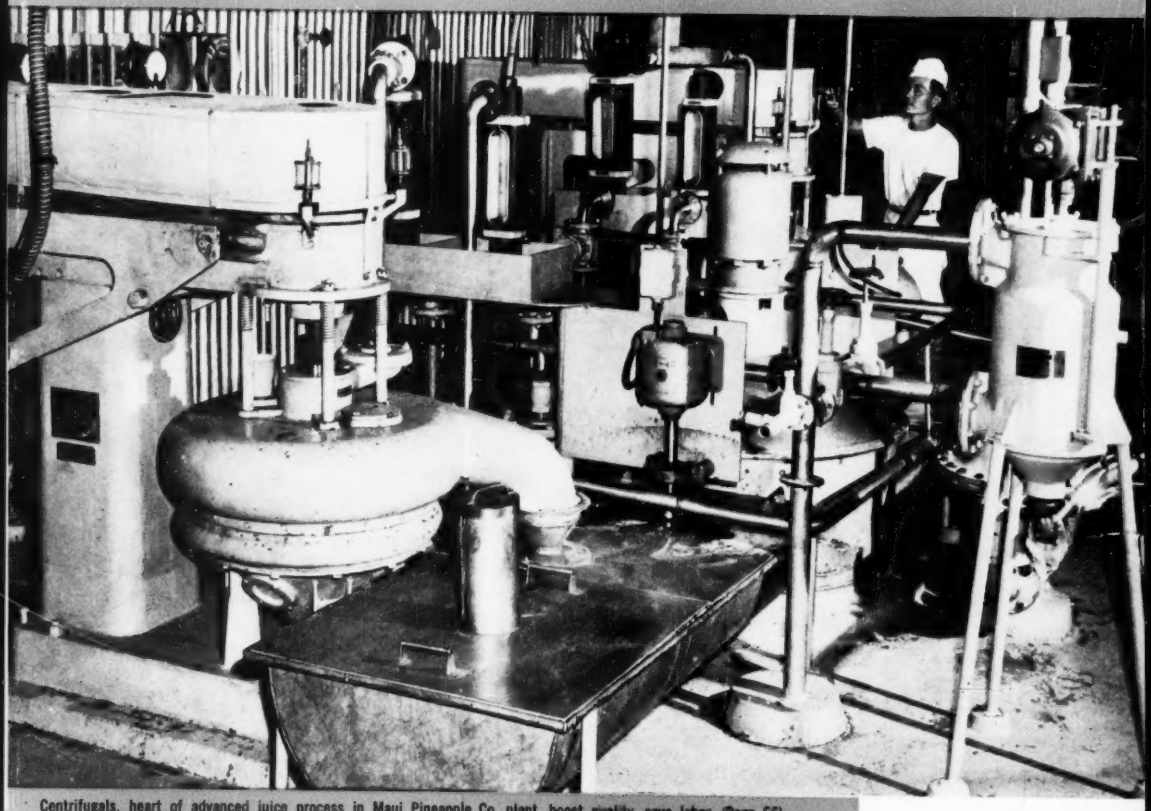

Centrifugals, heart of advanced juice process in Maui Pineapple Co. plant, boost quality, save labor. (Page 56)

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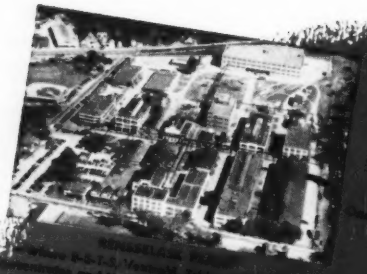

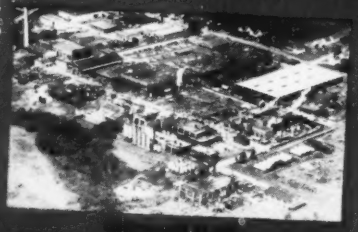

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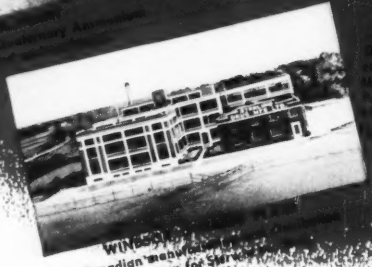

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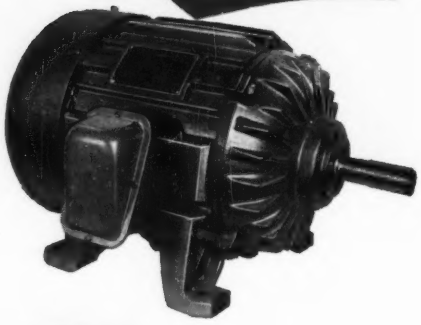
ALLIS-CHALMERS

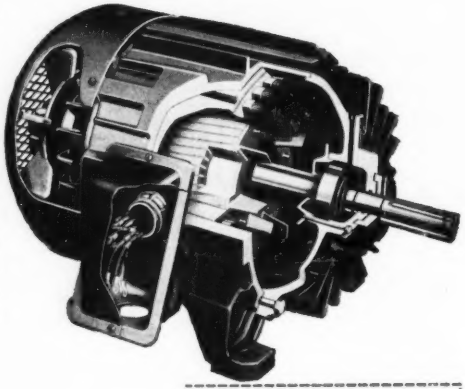
Totally-Enclosed Fan-Cooled MOTORS

Look Outside



Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

See WHY THIS IS YOUR BEST MOTOR BUY

HERE IS A MOTOR that is different from conventional TEFC motors; built with an entirely different cooling system that gives you big savings in lower maintenance, more continuous service and less trouble in the toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZ TEFC motor since areas that might collect dirt are exposed and easy to clean.

GET DETAILS NOW — *Ask your nearby Allis-Chalmers Authorized Distributor or District Office for more complete information on this high performance TEFC motor. Or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.* A-3578

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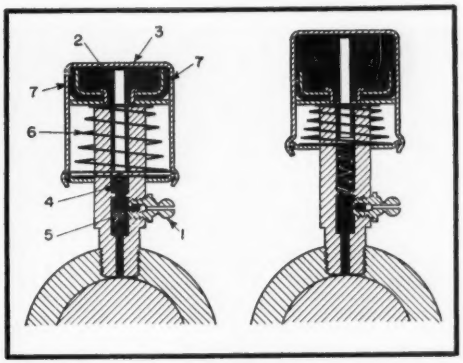
ALLIS-CHALMERS

PRACTICAL IDEAS



Low-Cost Bearing Insurance

By replacing the usual grease-gun fittings on motors and shaft bearings with special self-feeding grease cups (see photo), we have not only put an end to burned-out bearings, but also have cut grease consumption, reduced lubrication maintenance, and improved the cleanliness around motors and machines.

Here is how the adapted lubricator operates.

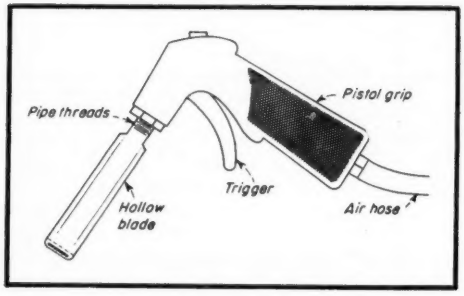
As grease is applied (see sketch) through a standard hydraulic-gun nozzle (1), check valve (2) rises against the top of the cup (3). The check valve, pressed up by spring (4), closes when the cup is filled, preventing further damaging pressure against the cup.

As grease flows to the bearing through feed channel (5), tension of spring (6) forces the cup top down to press on the check valve which, when open, permits uninterrupted flow of grease to the bearing. The grease, being confined to the cup by leather cup-washer (7), cannot spill or leak.

As grease is supplied to the bearing, cup (3) descends, serving as a gage of the grease remaining.

Holding ½ oz. of grease under constant pressure, the lubricator feeds only as the bearing requires. Thus, no grease is wasted. Furthermore, since one filling of the cup will lubricate the average bearing for approximately two months, lubrication maintenance requires little time or vigilance.

And also, because of the infrequency of filling and the lubricator's non-leak construction, oil or grease messiness around machines is avoided. As for the lubricator employed, the one we used was obtained from the A. L. Watson Co., Milton, Mass.—*D. Bradshaw, Plant Engineer, H. A. Johnson Co., Boston.*



Better Way to Empty Meat Loaf Pans

With the aid of a shop-made gadget attached to an air pistol, a meat packer in Virginia now easily removes sandwich-type loaves from the containers in which they are prepared.

Usual method of preparing such loaves is to pack the prepared meat into stainless steel pans of the desired size and shape and then chill until firmly molded. Gelatin or related type of filler is commonly added to the meat to assure adhesive qualities and improve the consistency of the product.

Cooked hams molded in this manner are easily removed, after chilling, by tapping the metal pan lightly on a block of wood. But softer loaves, such as pork tongues are molded in a container made of lighter gage metal, and a tap does not readily dislodge the loaves, whereas a hard knock is apt to damage the expensive containers, as well as injure the loaf.

Equally serious is the fact that slow-downs occur because removal of loaves from pans frequently bottlenecks the supply of chilled loaves to the stuffing and tying stations.

All this trouble ended, however, when sandwich loaves were removed from pans by compressed air. In detail, this is how the air pistol was constructed and how it works:

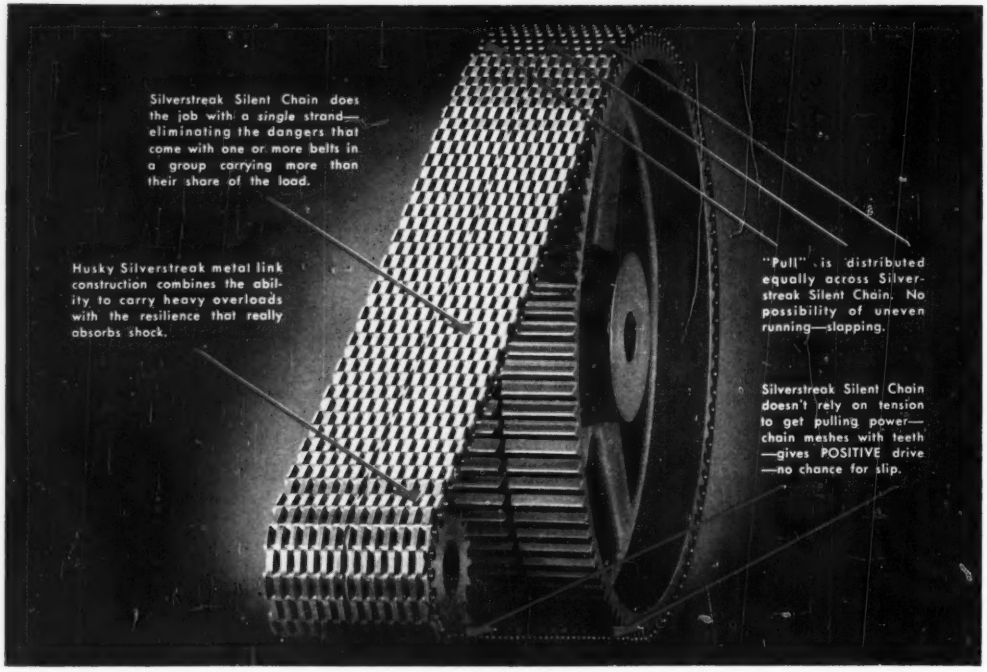
A pistol grip equipped with trigger valve was attached to the free end of a flexible hose connected to a compressed air line. Screwed into the exhaust end of the pistol was an ordinary piece of ½-in. steel pipe 5 in. long. This pipe had been flattened in a vise, so that it formed a hollow knife-like blade.

Tip of this blade was then filed so that one wall projected slightly beyond the other to form a thin edge for easy insertion between the pan and the loaf of meat.

To remove loaves from pans or molds, an operator merely thrusts the end of the blade between the loaf and the pan and pulls the trigger. The meat loaf is removed with astonishing ease.

This little gadget has increased the speed of emptying pans without injuring the loaves. Pans now last longer, and production bottlenecks has disappeared.—*A. B. Bush Enos, Industrial Engineer, Richmond, Va.*

Get full rpm transmission...


Silverstreak Silent Chain does the job with a *single* strand—eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak metal link construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power—chain meshes with teeth—gives POSITIVE drive—no chance for slip.

LINK-BELT Silverstreak Silent Chain Drives

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TAKE the proven road to increased production — through the best in high-speed power transmission. You'll find Link-Belt Silverstreak Silent Chain Drives are 98.2% efficient. With normal maintenance, you have a *positive* drive that runs for years and years.

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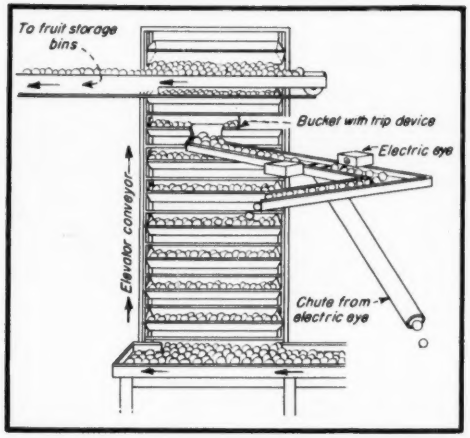


Sampler Picks One Out of a Thousand

With the aid of an electric-eye secondary selector, a 40-lb. sample can be taken from a 20-ton truckload of citrus fruits—the sample representing the cross-section of the load with better than 98 percent accuracy.

How the sampler—developed and installed at Real Gold Citrus Products Co.—is constructed and how it operates is shown in the sketch.

Oranges are brought by conveyor from the unloading point to a vertical lift conveyor which carries them to a belt conveyor passing over the tops of the storage bins. Two elevator baskets or troughs out of the 48 on the vertical lift have slots which, when a catch is tripped, release a few oranges into a chute which rolls them in single file past an electric eye.

This arrangement counts the fruit and selects one out of a predetermined number. Fruit thus singled out drops down another chute into the sampling room, where it and its companions, forming a total weight of about 40 lb., constitute a sample of the entire load. Oranges in the sample are reamed, juice content measured, and brix determined. Analysis thus made is an accurate determination of the juice content and brix of the entire load.

After the analyses, juice from the samples is blended with juice from the load. Peels go to the by-products plant. No loss to plant or shipper is incurred by this sampling.—*From article in "Citrus Leaves" (Vol. 31, No. 8), publication of Mutual Orange Distributors, Los Angeles.*

Freeze-Proofs Outside Pumps

Here's a "handy" for those with pumps that are located in outside pumphouses and hence might freeze and be damaged by low-temperature weather.

The first thing to do to prevent water systems from freezing inside the pumphouse is to insulate the enclosure with 4 to 6 in. of fill insulation. Next supply just a small amount of heat. This can be accomplished economically—especially if the building is wired, for one or two electric light bulbs, connected with a simple chicken-brooder thermostat, are generally adequate to prevent freezing.

Current is consumed only when the temperature drops below the thermostat setting. Light bulbs of 100-w. capacity should be located near the pumps and pipes.—*M. G. Huber, Agricultural Engineering Specialist, Oregon State College, Corvallis, Ore.*

Paint on Windows Keeps Plant Cooler

Just by applying glare-reducing paint to all windows in our 490-ft.-long one-floor winery, inside temperature during hot months was lowered more than 5 deg.

Winery building (right in photo) was almost like a greenhouse in its maximum admission of daylight. Summer temperatures were high and sun-glare excessive.

One way in which temperatures might have been lowered was through use of refrigeration equipment. But cost was considered prohibitive. Also, excessively costly would have been removal of all windows and bricking, or otherwise closing the openings.

Then we experimented by covering the window panes with a blue paint. This shut out glare, but admitted some light. All told, it turned out to be most successful.

It is now much more pleasant to work in the plant, not only because of the temperature differential, but also because of the soft light and the absence of glare. And even a 5-deg. difference in temperature is advantageous in the processing and storage of winery products.—*John Nano, G. F. Heublein & Bro., Hartford, Conn.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

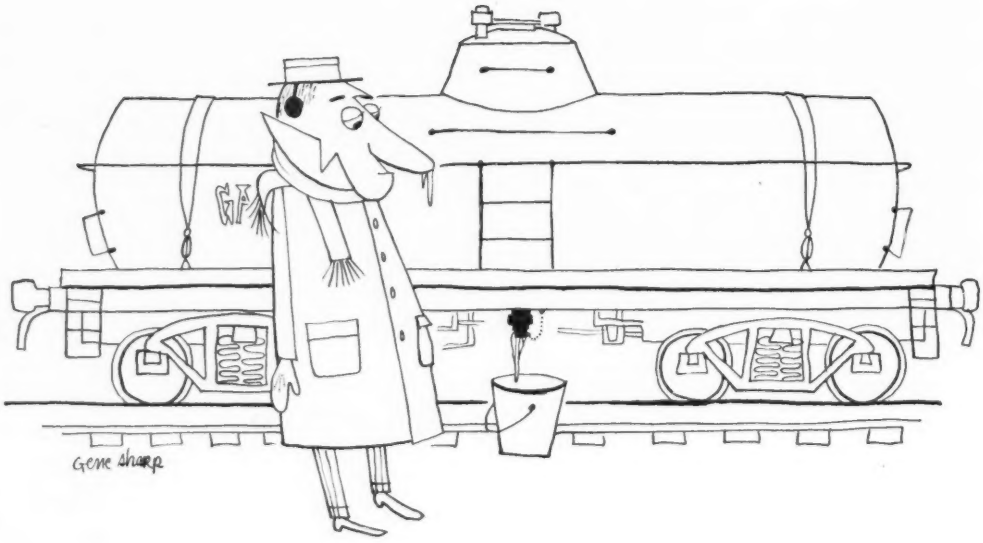
Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

NOVEMBER PRACTICAL IDEA voted best was "Device Polices Capping Operation", submitted by Harry C. Englefield, Chief Engineer, Danforth Wines Ltd., Toronto, Can. Described was a shop-made mechanism that detects improperly seated screw-caps and automatically side-tracks the faulty bottles to a reject table.

THE CARE AND NURSING OF TANK CARS



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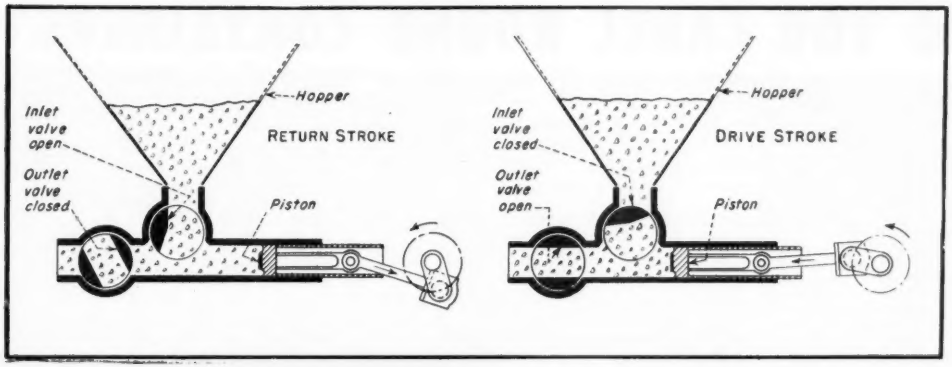

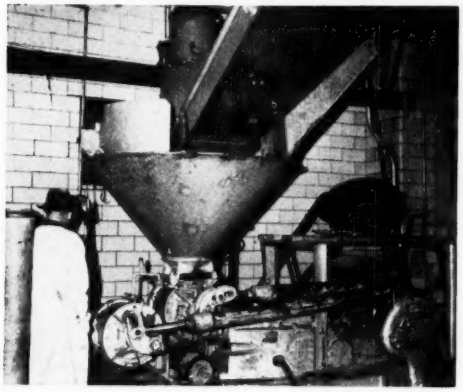

Meat Conveyed by Concrete Pumper

Adapting to food plant use a pump designed to transport concrete mixes has saved E. Kahn Sons Co., the labor of eight men and speeded an important processing operation.

In addition, this unusual installation made aisle space available for processing, while eliminating maintenance of hand trucks and the rutting of floors traversed by them.

Formerly, fat trimmings sent to lard rendering were tossed into metal hoppers mounted on trucks, which needed large aisles for maneuvering, hence reduced cutting and trimming space.

Also, daily maintenance of the trucks was necessary, as well as periodic repairs to floors. Furthermore, eight men spent their time laboriously pushing filled carts to and from rendering tanks.

This was the situation when an idea man took over—an engineering department employee who, while on vacation, had watched fascinated as a pump shoved mixed concrete through a pipe to a construction job many hundreds of feet away.

If such a pump could deliver concrete, in volume, up to 1,000 ft., surely it could pump fat trimmings. So, a machine (see photo) similar to that used on the construction job was purchased, installed, and adapted to the pumping of chunks of fat.

With this set-up, all fat trimmings are dropped into chutes at the conveyor's sides. Gravity carries them to the hopper-fed pump that pushes the fat through 6 in. pipe to the rendering tanks. Powered by a 25 hp. motor, the pump delivers 30,000 lb. of fat trimmings per hour through 200 ft. of piping that twice turns at right angles enroute to the tanks.

Thus the trucks have been dispensed with, and the labor they demanded saved.

Time of rendering also has been trimmed, because delivery of fat to each tank is now continuous and uniform, and heat can be applied as soon as the fill starts—meaning more fat rendered per tank per day.

The pump is a simple contrivance (drawing). Basically it comprises a hopper, two valves, a cylinder and piston. Inlet and outlet valves are similar to plug cocks, mechanically opened and closed, synchronized with piston strokes. Operation is two cycle, with a single charge of fat shoved ahead at each forward travel of the piston.

The pump cylinder is cleaned continuously. Wash water introduced behind the replaceable rubber piston end cleans the cylinder back of the piston without making contact with the fat. The cylinder in front of the piston is accessible for cleaning when the pipeline is disconnected.

At the end of a day's run, the section of pipe next to the pump is detached by loosening a toggle coupling. After a rubber-tipped "go-devil" or wad of wet cloth sacking is inserted, a pneumatic head is clamped on the pipe end, and air at 90 lb. pressure forces the wad through the pipe, cleaning the line of remaining fat. The pipe is then steam cleaned and finally lubricated with an oil soaked cloth wad, air driven through the line.

Such a pump (the one used here is a Chain Belt Co. "Cretepump") should find many valuable uses in food plants.—*FE Staff.*

Controls Pests With Aluminum Wool

Fifty pounds of metal fiber ended a pest control problem which had assumed real magnitude in one of our buildings. Bats and birds had polluted our otherwise-clean structure.

When other methods of barring these pests failed, we turned to 4-in. ribbons of aluminum wool. Packed in 25-lb. rolls, this material was obtained from Brillo Mfg. Co., Brooklyn, N. Y.

To rid the building of the fliers, all openings were first plugged with the wool at the points where the corrugated iron met the mud sill at the base of the structure. This was done by playing out the ribbon and packing it firmly into the openings.

Similarly, all entrance spaces were plugged where the walls met the roof. This procedure was extended to calking every corrugation where wood was nailed to the metal sheets.

By observing droppings, bat roostings were located. Overlooked entrances were thus traced. All of these were packed, often not once but several times. There must be sufficient tightness in the packing, for the pests may try to pull out the wool.

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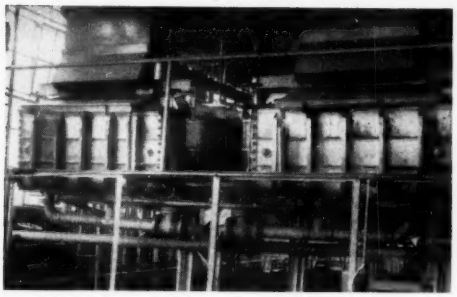
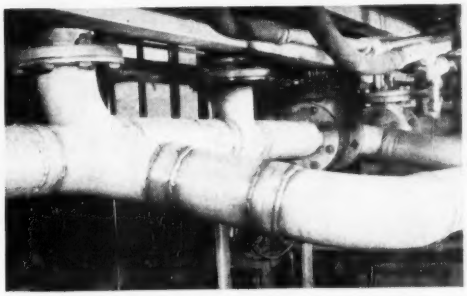
It took considerable observation over a period of time to discover all roostings and all ports of entrance in the 50 x 200 ft. building. However, the number of bats in the building diminished noticeably from the start of the plugging. Finally, the locating and closing of all openings ended the invasion. Less than 50 lb. of wool was used.

Elimination included nesting of birds in the eaves. All places where they might nest were wool-packed. Wool was then applied to many other spots in the building—to fill holes around pipes, cracks in door jams, knot holes in closets, and to seal off doors seldom used.

Though the material can be applied in many places for many purposes, one use should be avoided. Aluminum wool will "rot", due to electro-decomposition, when packed around iron pipe or in any areas where water wets both metals.

For the general purpose of pest control, the wool proved less expensive, in both cost of material and labor of application, than estimated, and it achieved better results than anything previously tried.——*B. C. McCorkle, in a bulletin issued by Association of Food Industry Sanitarians, Inc., San Francisco.*





Thin Gage Stainless Pipe Pays Off

By replacing heavy pipe with light walled stainless steel tubing, several advantages have been gained at Knouse Foods Cooperative, Inc., Peach Glen, Pa. The new type pipe was installed on vacuum cookers used in processing apple slices (photo left).

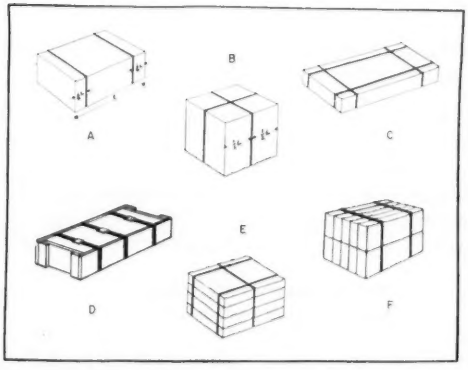
The economic per-foot cost of thin gage—in this case, Carpenter "Schedule 5"—was an immediate inducement. However, problems had to be considered and tests made before this departure from standard practice.

Results justified the changeover. Here are some of the gains: The new thin wall 4-in. tubes have standard outside diameters. Therefore, hookup with existing lines (photo right) was less difficult than might have been expected.

Because of the thin gage, inside diameters are greater than those of standard pipe. Advantage of this is that flow through the thin wall tubes is greater than through standard pipe of the same outside diameters.

Valuable as they are, these advantages would have little importance were it not for the fact that thin wall pipe handles required pressures with ample margin of safety.

Since about twice the footage of thin gage stainless steel tubing can be produced with the same amount of scarce nickel and chromium alloys, adaptation of this new thin wall tubing wherever possible is quite important to the food industry, which is so dependent upon corrosion resistant materials.



Straps Cut Box Damage

Wood boxes and fiber shipping containers have a far better chance to withstand shipping damage if they are properly reinforced with steel strapping.

Steel bands strengthen containers, thus make them more resistant to transit bumps. Also, they reduce possibilities of loss of contents by breakage or pilferage. Small light boxes may require only a single strap for adequate reinforcement.

For maximum strength and safety, large rectangular containers (A in drawing) should have two girthwise straps about 1/6 of the length of the box from either end, and an additional strap may be necessary if more than 2-ft. remain between them.

On boxes that are square, or nearly so, two straps should be applied as at (B). And when boxes are long and narrow, as at (C), four straps are indicated. Here, attach lengthwise straps first, with girthwise straps not more than 24 in. apart.

When fiber containers are strapped, bands should be tensioned to make them flush with the box at all points, but not tight enough to buckle the box or depress the corners. But on wooden boxes (D) enough strap tension should be applied to indent the edges. Application immediately before shipment avoids a loosening effect which follows drying and shrinkage of the lumber.

Small lightweight containers (E), to be shipped long distances or exported, should be bundled together for protection, for ease of handling and to take advantage of lower shipping rates. In preparing wooden boxes for

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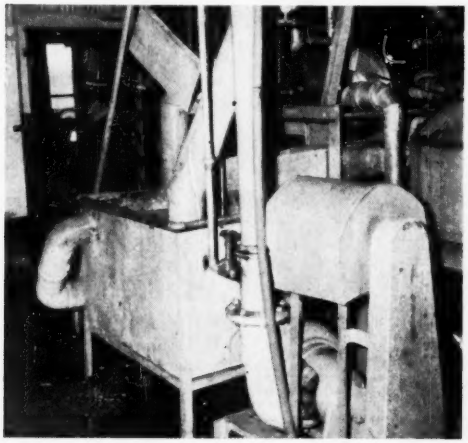
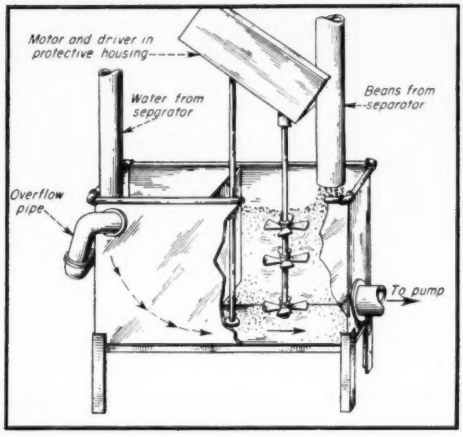
export, steel strapping should be stapled in place at approximately 6 in. intervals.

Light packages prepared for shipment by express should be bundled into 10-lb. units, rather than shipped singly. When this is done, express charges are slashed. Then, the minimum 10 lb. charge is not made on each parcel, but instead, the express charges are those of the total weight of the shipment. For instance, ten 1-lb. units (F) can be shipped for the cost of one 10-lb. unit, if properly bundled and strapped.—*Acme Steel Co., Chicago.*





Device Keeps Pump Feed Uniform

Installation of motor driven propellers in the reservoir which feeds a pipeline-conveyor pump has been the means of preventing cut-beans from floating in the feed sump.

Thereby, an uneven flow of product to the inspection lines has been avoided.

At our Exmore, Va., plant, cut beans are prepared in a separate building from that in which they are inspected and frozen. Transfer from one building to the other (a distance of about 150 ft.) is accomplished by pumping products suspended in water.

Pipeline transportation is satisfactory. However, the elevation of the pipeline entering the freezer building is below the level of the equipment into which it must discharge. Separating products from the original pump stream and injecting them into the flow of a second relay pump is necessary.

Water from the separator flows into one side of a partitioned tank (photo), beans discharge into the other. This partition, with water-pass at the bottom, confines the operation of injecting beans into the water entering the suction side of the relay pump.

At this point in the procedure, a difficulty was met. Most of the beans flowed with the water to the bottom of the tank, and thence into the suction end of the pump. However, some floated, forming a mat-like surface which prevented a uniform flow to the pump and on to the processing equipment.

To make "floaters" into "sinkers", a three-propeller shaft (see sketch) was lowered into the reservoir.

Shaft and motor driving it, also gears and housing, were fabricated in one assembly. And with attachment by cable and pulley to a steel upright, the propellers could be raised or lowered in the reservoir. Downward suction of the resulting agitation assured uniform flow of beans and water into the suction end of the pump.

That ended the problem of floaters. Moreover, this system functions equally well for other cut or diced products, preventing lighter portions from floating and thereby interrupting uniform flow to the following processing operation.—*A. S. Pearson, Plt. Eng., John H. Dulany & Son, Inc., Exmore, Va.*

Improved Chutes Put End to Injuries

Frequent accidents were eliminated when we substituted chutes made of wood and lined with Formica for our former ones constructed of metal. In addition to curbing hazards, man-hours necessary to set up carloading facilities were cut in half.

We had been using series of prefabricated metal chutes to deliver sacks of flour to dockside and into railroad cars. But though satisfactory in service, they were so heavy and cumbersome that two men were needed to handle them.

Cuts and bruises frequently occurred, since chutes were repeatedly shifted during loading. Then, when two men were seriously hurt while shifting the chutes, the decision was made to switch to the lighter ones made of wood.

Formica was selected for the bottoms of the chutes. When waxed, this material has an almost frictionless surface, giving excellent sliding qualities.

In addition, the section of the chute used for the last lap inside the cars has now been mounted on a light wooden frame and made mobile with casters. Hence, one man alone can handle the job. And there has not been a cut or bruise to any worker since the improved equipment was installed.—*Francis Smith, Millright, King Milling Co., Lowell, Mich.*

New G-E equipment saves Oscar Mayer $750 per week!

Better steam extraction, plus proved reliability of old turbine, determines midwest meat packer's choice of new G-E unit

As part of a plant expansion program, Oscar Mayer & Co., meat packers, early in 1950 increased the power-system capacity of its Madison, Wisconsin packing plant by installing a General Electric 3000-kw turbine-generator and metal-clad switchgear assembly. An important factor in their decision was the performance of an existing G-E turbine-generator in the plant. In 10 years of continuous operation, this unit has needed only two minor repairs. That's reliability!

Running 16 hours per day, the new G-E turbine-generator provides more efficient steam utilization, supplying extra process steam and electric power. As a result, it saves about 100 tons of coal per week at $7.50 per ton, or $750 per week. That's savings!

If the economics of *your* food-processing operation justifies co-ordinating generation of power with production of process steam, you too will want the reliability and savings that G-E power-system equipment can give you. Ask your G-E food-industry specialist to discuss your modernization or expansion needs—early in your planning. Meanwhile, write for Bulletin GEA-3277 "Turbine-generators." *General Electric Company, Schenectady 5, New York.*

POWER SYSTEM EQUIPMENT

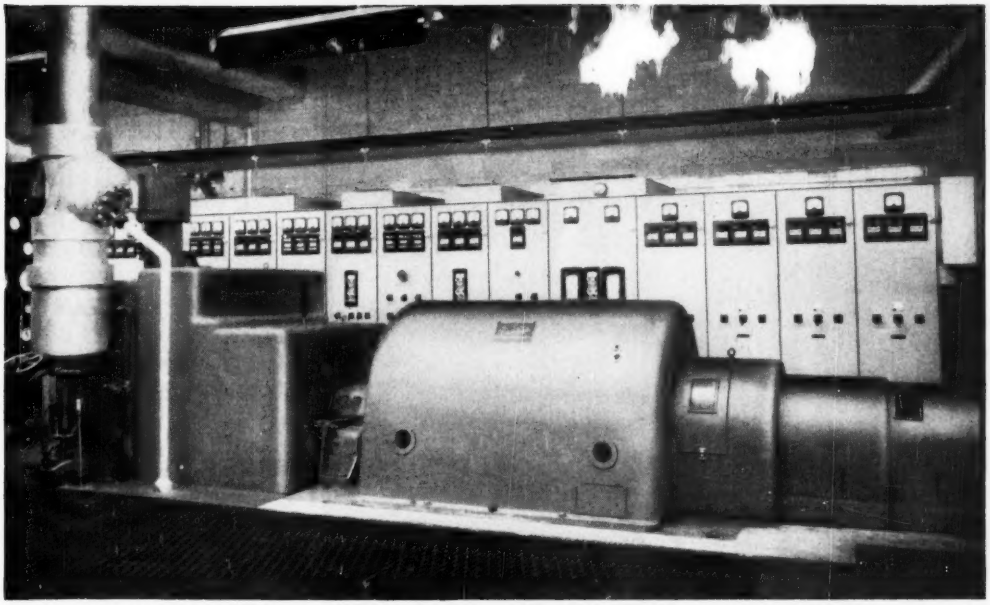
FOR

food plants

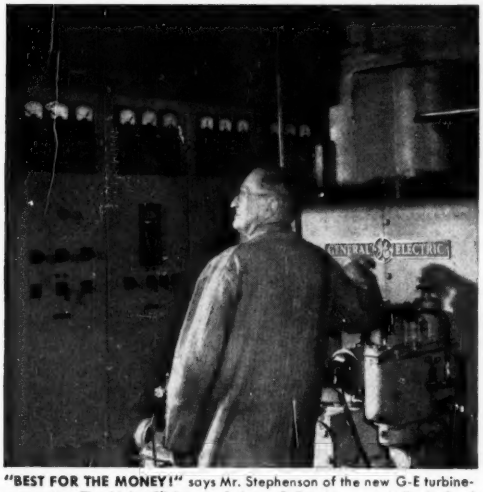
NEW!

G-E Motor Course helps train your food-plant workers

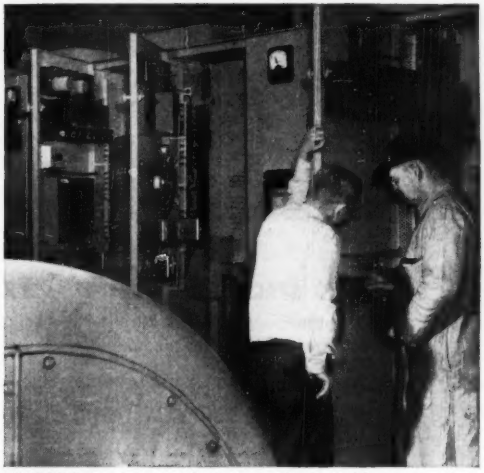
General Electric's new Motor Selection and Application Course is timed to meet today's need for more motor know-how on the part of your employees. A G-E "More Power to America" program, it pictures clearly and simply how motors work, types now in use, and practical pointers on selecting and applying them for specific jobs. Complete kit includes instructor's manual, 9 slidefilms with records, student review booklets, and sturdy carrying case. Ask your G-E representative for a free copy of the manual. For more information on the course, send for Bulletin GEA-4938-16.



BETTER EXTRACTION PERFORMANCE is obtained from this new G-E 3000-kw turbine-generator than from the previous unit, according to Mr. E. B. Stephenson, chief operating engineer of the Oscar Mayer plant in Madison, Wis. The unit, together with the G-E metal-clad switchgear in background, was recently installed as part of a plant expansion program.



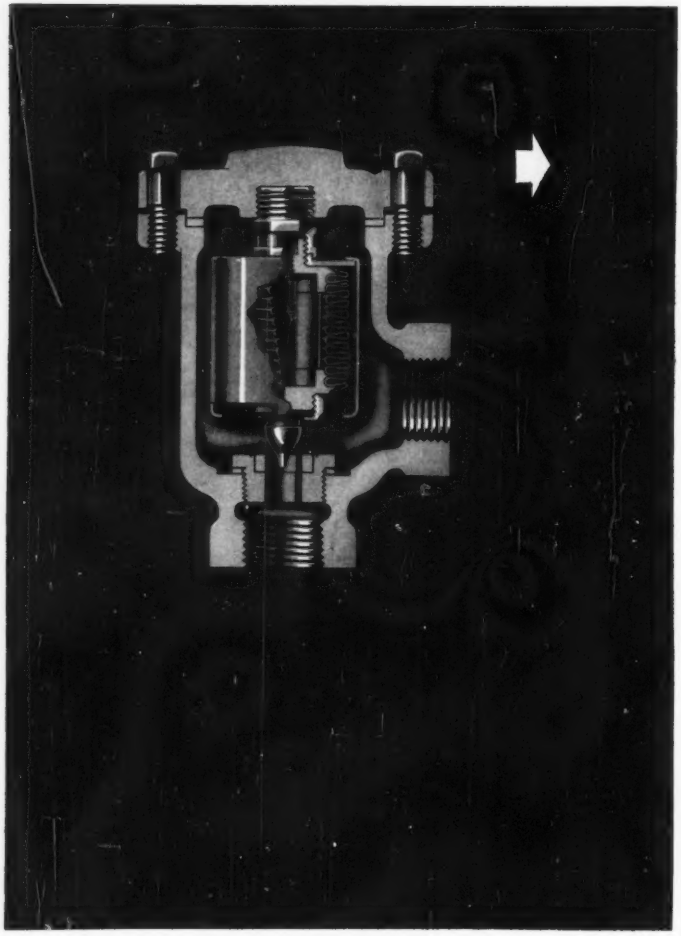
"BEST FOR THE MONEY!" says Mr. Stephenson of the new G-E turbine-generator. The high efficiency of these G-E units—especially in food plants where they help co-ordinate the production of process steam with the generation of electric power—provides maximum output per dollar of fuel cost.



PROTECTION against short circuit damage is provided for packing-plant equipment by the new G-E metal-clad switchgear assembly. Factory wired and assembled, these units are quickly and inexpensively installed, permit expansion within existing buildings by their space-saving compactness.

GENERAL ELECTRIC

652-10



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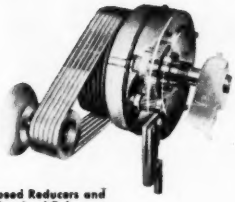

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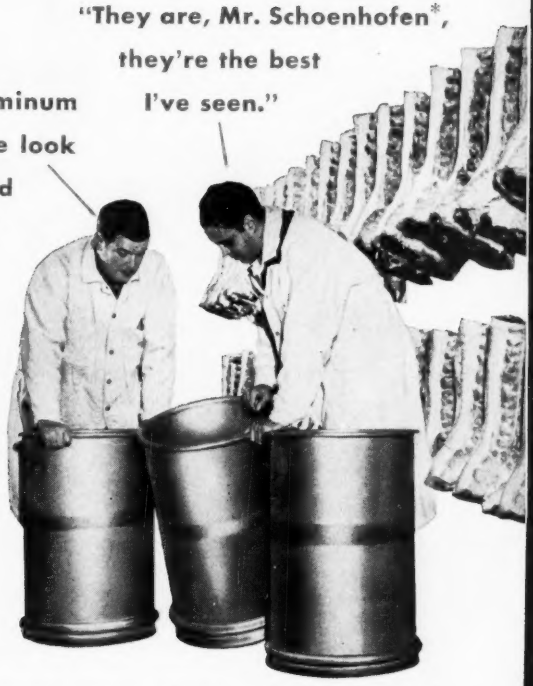
"These aluminum drums sure look rugged and sanitary."

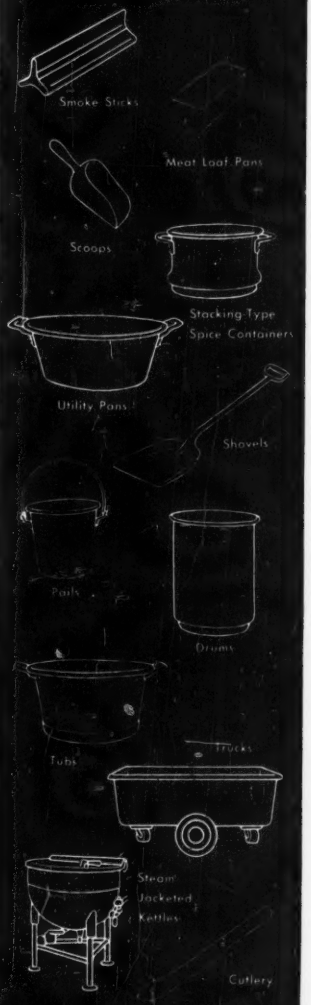


You'll hear favorable comments about sanitary Wear-Ever aluminum drums wherever they're used. They protect products from dirt, paper, splinters, rodents, insects—anything that might get into foods. And friendly-to-foods aluminum safeguards flavor and purity.

Wear-Ever storage drums are made of an extra-tough, extra-durable aluminum alloy that resists denting and scratching—cuts replacement costs. They're easy to move, too, because aluminum is light. Used with a Wear-Ever dolly, they make inter-department transportation easy. Two types of covers are available: 1—Hinged type and 2—Slip over—with handle, and with hanging hook on inside, enabling cover to be hung on side of drum. Open bead makes cleaning easy. A "wearing ring" attached with a continuous, sanitary weld keeps bottoms off rough floors. Comes in gleaming, attractive finish. Mail coupon for details.

Mr. Schoenhofen, Plant Superintendent of Pfaelzer Brothers, Chicago, purveyors of choice meats. Pfaelzer Brothers use these drums as transport and trimming containers.

WEAR·EVER ALUMINUM EQUIPMENT FOR FOOD PLANTS



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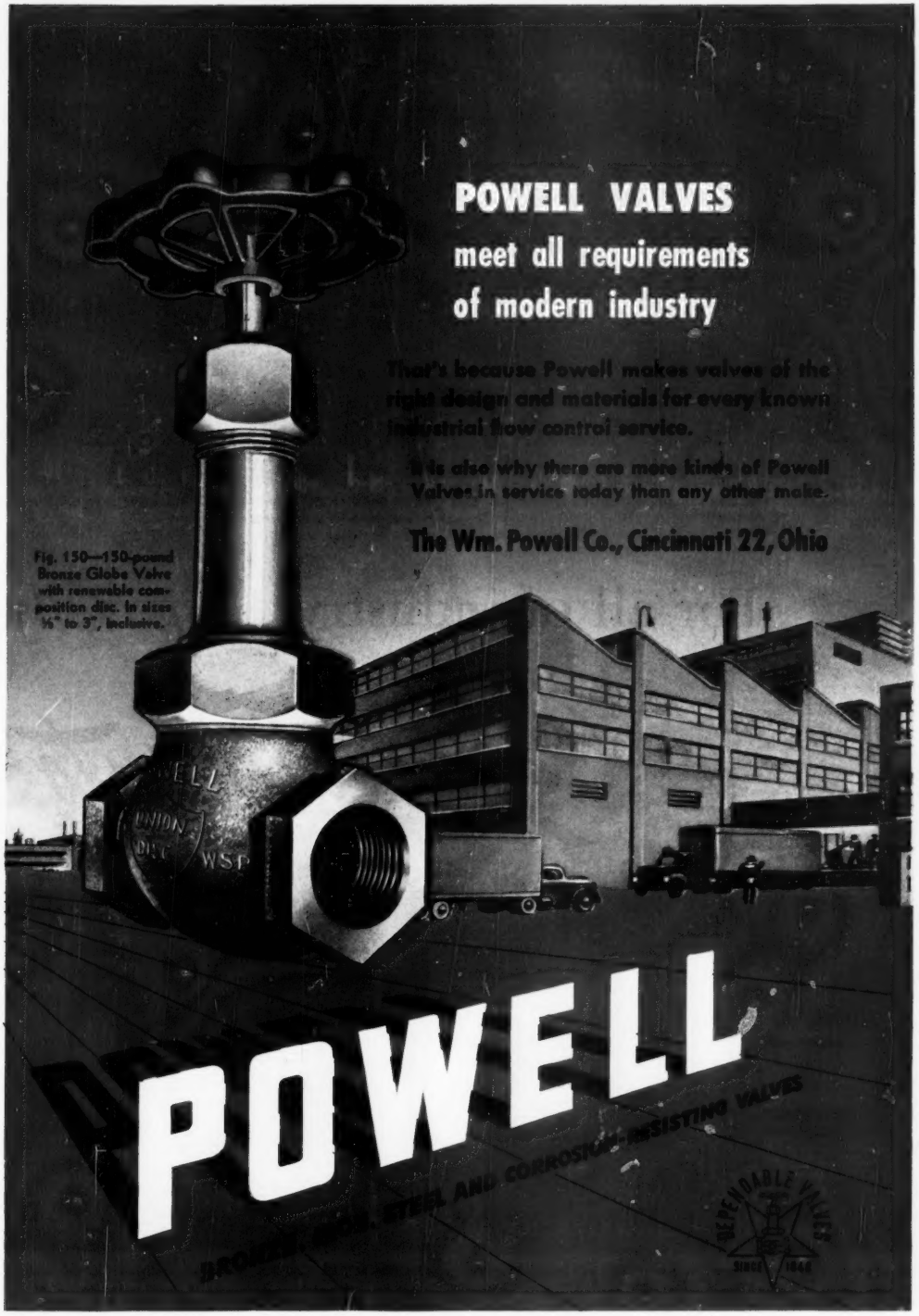
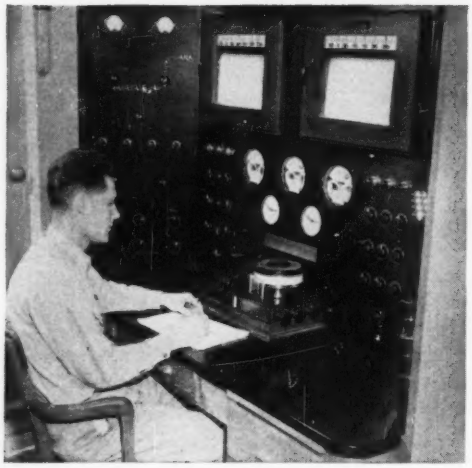
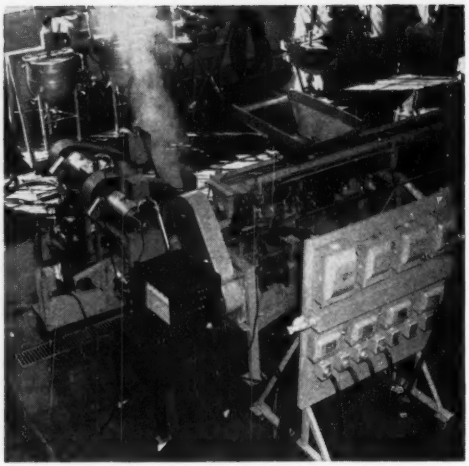

POWELL VALVES
meet all requirements
of modern industry
That's because Powell makes valves of the right design and materials for every known industrial flow control service.
It is also why there are more kinds of Powell Valves in service today than any other make.
The Wm. Powell Co., Cincinnati 22, Ohio
Fig. 150—150-pound Bronze Globe Valve with renewable composition disc. In sizes ½" to 3", inclusive.
POWELL
BRONZE, IRON, STEEL AND CORROSION RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846



EFFECTIVE INSULATION—*Used in both research and quality control, these instruments automatically record temperatures at many points in a "test wall" of paper insulating material.*

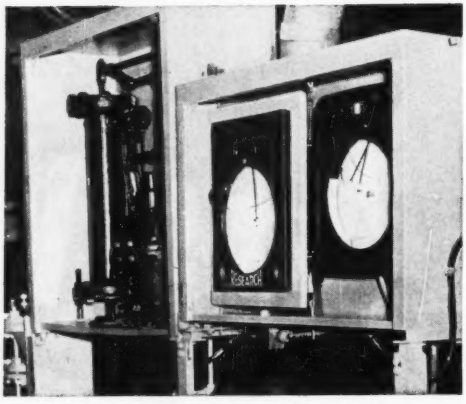


BETTER FOODS MEAN HEALTHIER BABIES—*Pilot plant at Baby Foods Division of Gerber Food Products makes use of* **ElectroniK** *recorder to check all-important processing temperatures during test runs.*

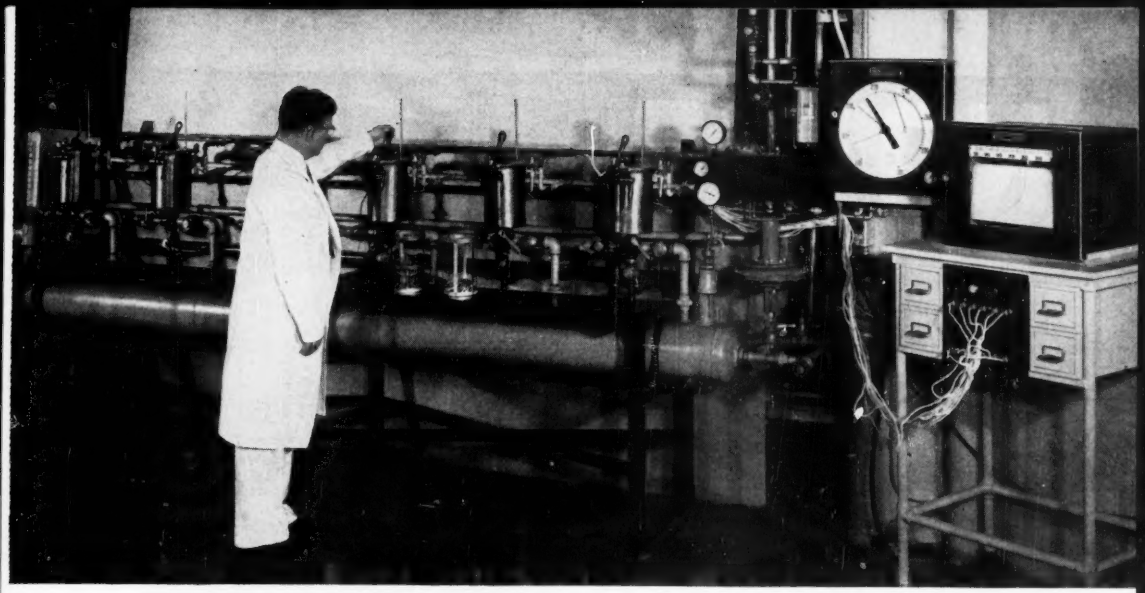
For all of industry... *especially*

Instruments

TORQUE MAGNETOMETER *used by researchers at United States Steel Corporation tells whether a steel sheet can be "drawn" into a deep cap for a ketchup bottle. Shape of curve drawn by recorder pen tells the magnetic, hence the shaping, story.*



FILAMENTS FOR FABRICS — *These instruments, in one of America's foremost rayon plants, are contributing to the stability of pilot plant processing in the development of finer filaments for tomorrow's fabrics.*



CANNED FOODS RESEARCH *is simplified by recording and controlling instruments in the laboratories of the American Can Company. Circular chart instrument controls temperature in miniature retorts used for special test cans . . . strip chart instrument records temperature in each retort.*

for the food industry

accelerate research

THE DRAMATIC achievements of the Food Industry in recent years have stemmed from close cooperation among process specialists, equipment designers and instrumentation engineers.

Today's researchers get things done in a hurry. In many food laboratories, a variety of Brown instruments are faithfully recording temperature, pressure, flow, humidity, pH . . . and other variables important to laboratory, pilot plant and process alike.

Brown instruments and controls are helping to accelerate research, are helping to speed new ideas from the drafting boards to practical realities. Even now, more new developments are in the offing, incorporating new techniques and new controls.

Our local engineering representative will welcome the opportunity to discuss your instrument requirements . . . for research or process operation. Call him in today, he is as near as your phone. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

● *Important Reference Data*

Write for 84-page bulletin "Instruments Accelerate Research" . . . and Data Sheets on instrumentation for a variety of specific applications.

NOTES for Process Engineers

C. H. Wheeler OF PHILADELPHIA

COOLING TOWERS—VACUUM REFRIGERATION—HIGH VACUUM PROCESS EQUIPMENT—MICRO-PARTICLE REDUCTION MILLS—STEAM CONDENSERS—STEAM JET EJECTORS—MARINE CONDENSERS & EJECTORS—DECK MACHINERY

YOU MAY BE ABLE TO LOWER YOUR COOLING COSTS

INVESTIGATE C. H. WHEELER STEAM JET VACUUM COOLING SYSTEMS

Where your chilled water temperature requirements are 35° to 65°F and you have steam available, C. H. Wheeler engineers are prepared to submit recommendations on equipment for the lowest operating cost consistent with reliability and the necessary marginal factors on performance. In addition to the low first cost of these units, the absence of moving parts (with the exception of pumps) results in extremely low maintenance costs.

In the chemical industry, the chilling of water for finishing rolls in the manufacture of paper and rubber, for sulphite mills and other places employing acid recovery apparatus of the absorption type, are typical applications of C. H. Wheeler steam jet vacuum cooling systems. Cooling is by the well known principle of Flash Evaporation, using live or exhaust steam that you may be presently wasting.

A 36-page book on C. H. Wheeler Steam Jet Ejectors will be mailed you on request. It contains useful data and will augment your store of knowledge on the subject.

$13,500 ESTIMATED SAVINGS

IN 6 YEARS WITH A C. H. WHEELER COOLING TOWER

A C. H. Wheeler customer worked out his own engineering estimate of the savings assured through the purchase of a 3 cell C. H. Wheeler Cooling Tower of 12,500 GPM capacity. He chose C. H. Wheeler over a competitive 2-cell tower costing $10,000 less. The greater efficiency of C. H. Wheeler tower engineering results in estimated yearly operating savings of $2,261.

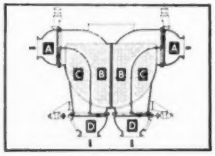
The formula employed by the customer and a tabulation of his figures has been reproduced for your appraisal. This, together with Catalog 145, will augment your knowledge of cooling tower operation. A request on your company letterhead will bring them by return mail.

Be sure to call a C. H. Wheeler representative early in your cooling tower plans. He shows you where to check for features of quality.

"REVERSE FLOW" CONDENSERS

Reduce Operating Costs because they are SELF-CLEANING

By an arrangement of electrically or hydraulically controlled sluice gates the flow of water through the condenser tubes is reversed. Refuse is flushed down the discharge in minutes, thus saving hours of downtime for hand cleaning. Here is how it works:

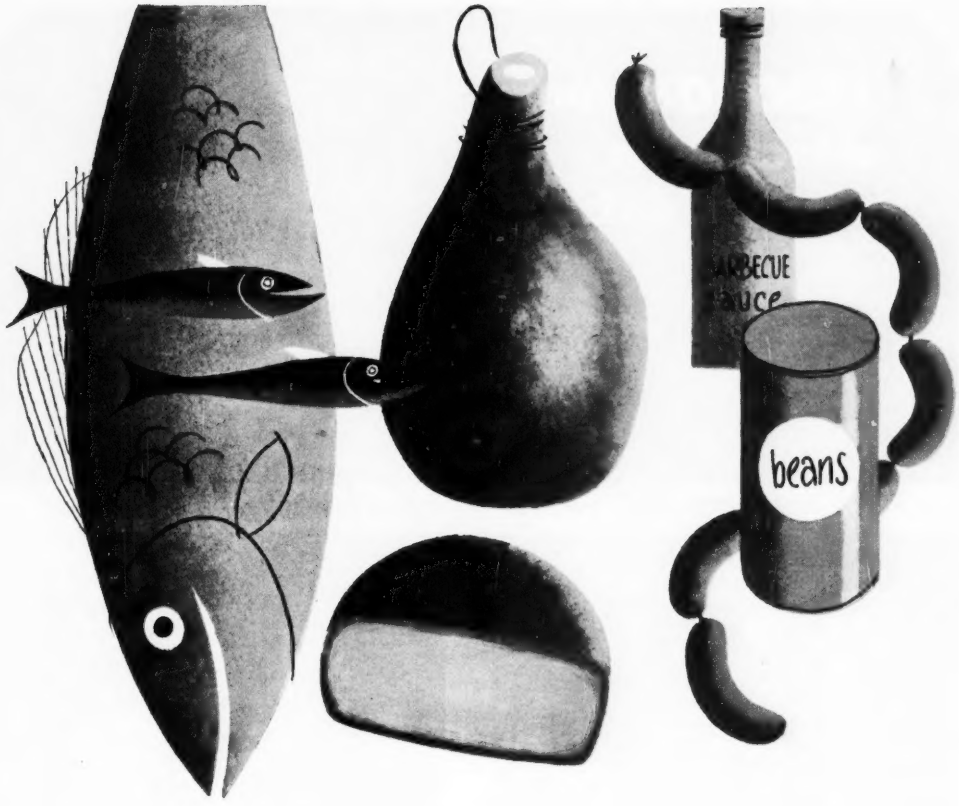


Both halves work the same but independently of each other. Right Side: (normal flow) Water enters divided water box at valve chamber A, with power port open. It flows through pass C to end of condenser, back through pass B and out through left port of D.

Left Side: Flow is reversed: Valves at inlet A and discharge D are changed to permit water to flow through B and back through C in the opposite direction, then out through D.

C. H. WHEELER MANUFACTURING CO., 1828 SEDGLEY AVE., PHILADELPHIA 32, PA.

REPRESENTATIVES IN MOST PRINCIPAL CITIES



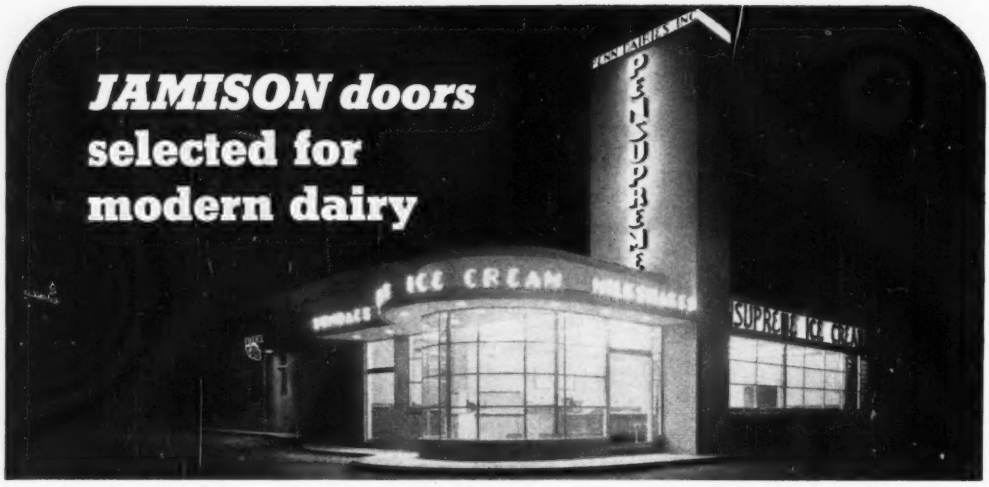
SYNTHETIC HICKORY SMOKE FLAVOR

Appetizing hickory smoke flavor may now be incorporated quickly and efficiently in a wide variety of food products, including meats, fish, cheese, and sauces. Based upon original research, our newly developed synthetic hickory smoke flavor is stable to high temperatures and is capable of long shelf life under adverse storage conditions. Affecting minimum shrinkage, convenient application of this flavor is accomplished by its ready dispersion in brines and liquid products or by dry mixing with salt or other meat-curing preparations.

FIRMENICH INCORPORATED
250 WEST 18th ST., NEW YORK 11

CHICAGO OFFICE: 612 NORTH MICHIGAN AVENUE
FIRMENICH OF CANADA LTD., 348 WALLACE AVENUE, TORONTO
GENEVA, SWITZERLAND . . . PARIS, FRANCE . . . LONDON, ENGLAND

JAMISON doors selected for modern dairy



Drive-In Dairy Restaurant Ice Cream Distributing Depot of Penn Dairies, Inc., Reading, Penna.

Ice Cream Hardening Room with fully metal clad Jamison Super Freezer door.

Kitchen Cooler equipped with two Jamison Standard Doors for easy access. Fully metal clad.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

For specifications and dimensions request Catalog No. 1.
Jamison Cold Storage Door Company, Hagerstown, Maryland, U. S. A.

A completely new and different type of

Wetting Agent-Detergent

NYTRON

TRADE-MARK REG. U. S. PAT. OFF.

FOR FOOD PLANT CLEANING

In HOT or COLD, HARD or SOFT WATER, NYTRON cleans thoroughly . . . rinses completely without leaving a sticky residue or deposit.

Equipment Cleaning

Fruit and Vegetable Washing

Floor and Wall Cleaning

NYTRON Improves Cleaning Action of Alkalies and Acids.

USE NYTRON WITH CAUSTIC

for Fruit Peeling
Bottle Washing
Other Special Cleaning Jobs

USE NYTRON WITH ACID

for Tile Cleaning
Removing Milkstone
Removing Lime Scale
Other Special Cleaning Jobs

A SOLVAY PRODUCT

It lowers the cost of your cleaning operations because less is required to do a thorough cleaning job! *It increases efficiency* because it combines powerful cleaning action with dependable safety! Here are the details of what NYTRON can do for you . . .

. . . NYTRON cleans walls, floors and painted surfaces without removing paint, without affecting tinned or plated surfaces. It washes tile and glassware without streaking; it completely removes oils, fats and greases. NYTRON rinses thoroughly and quickly—even in cold water—leaving no film or deposit to harbor bacteria. It works equally well in hard or soft water . . . leaves no cloudiness, no spots even in the hardest water. And NYTRON is safe, mild and non-toxic—will not affect normal skin!

Samples of NYTRON

—as well as detailed information and technical data on its uses in the food industry—are available on request. Get all the facts . . . see for yourself how NYTRON can help your business operate more efficiently, more profitably. Mail the coupon today.

SOLVAY SALES DIVISION, Allied Chemical & Dye Corporation
40 Rector St., New York 6, N. Y.

I want to know more about NYTRON, the entirely new type (patented) WETTING AGENT-DETERGENT, and its uses in the food field. Please send me free samples plus detailed non-technical information and specific technical data.

Name_____

Title_____

Company_____

Address_____

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It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

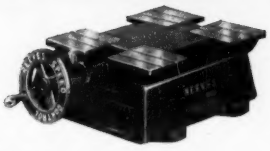
Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
324 WILSON, SO. NORWALK, CONN.

Reeves Vari-Speed Motor Pulley

converts any standard constant speed motor to a low-cost stepless variable speed drive . . .

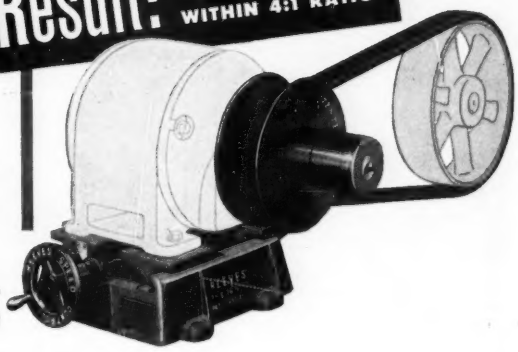


1. REEVES Motor Base provides sliding platform for motor. Handwheel or push-button control increases transmitted speed by moving motor toward driven machine, decreases speed by reversing the operation.

2. Disc Assembly connects directly to motor shaft. Assembly consists of two facing cone-shaped discs—one sliding laterally—and compression spring for mounting as a single unit on motor extension shaft.

3. Special V-Belt hooks up unit with driven machine. Belt fits between discs and over pulley on power input shaft of driven machine. Belt is adjusted to minimum center.

Result: INFINITELY VARIABLE SPEED WITHIN 4:1 RATIO



Unit instantly delivers any desired speed over entire range and maintains that speed without fluctuating even a fraction of an rpm.

The REEVES Vari-Speed Motor Pulley is the easiest, lowest-cost method of converting a machine with fixed speeds into a highly versatile unit of infinitely variable speed adjustability. Thus equipped, it can handle a wider range of work, better, faster and more economically, because machine speed can be changed instantly and accurately—without shutdowns—to meet the needs of every operation and every operator, *under every changing condition.*

This REEVES unit forms the actual driving element between motor and driven shaft . . . eliminates all auxiliary equipment such as chain drives, gears, belts, etc. . . . requires virtually no more space for installation than any standard belt or chain drive. It is built in eleven sizes, transmitting from ⅛ to 10 hp., over speed ratios from 2¼:1 to 4:1, inclusive.

The complete line of REEVES Speed Control equipment also includes two other basic units, the Variable Speed Transmission and the Vari-Speed Motodrive, which are offered in the widest selection of designs, sizes, capacities and speed ratios—handwheel, push-button or entirely automatic controls.

REEVES units have proved their ability to speed production, cut cost and increase profit in more than 300,000 widely diversified industrial applications . . . are listed as standard equipment on over 2,100 different makes of modern machines.

An experienced REEVES Speed Control specialist will be glad to work with you in selecting the units best suited to your needs. Write today, arranging an interview, and ask for Catalog FE7a-G.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

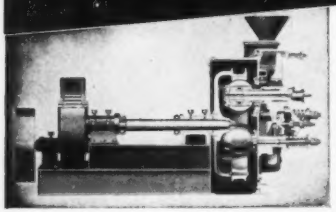
Recognized Leader in the Specialized Field of Speed Control Engineering

ACCURATE • VARIABLE

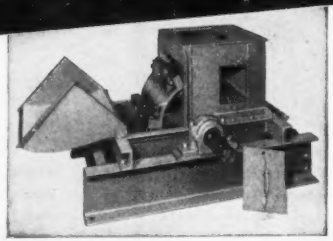
Reeves Speed Control

GIVES THE RIGHT SPEED FOR EVERY JOB!

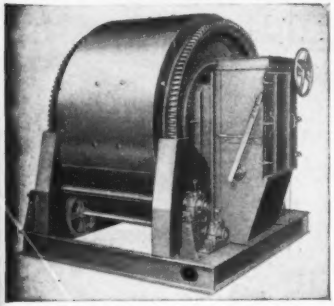
Step-up Production Lower Preparation Costs with STURTEVANT EQUIPMENT



RING ROLL MILL — for medium and fine reduction of hard or soft materials (10 to 200 mesh). Open-door accessibility for easy cleaning. Available in many sizes and capacities.

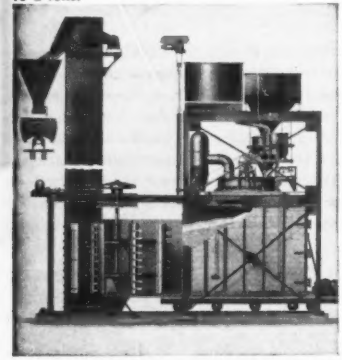


TAILINGS ROTARY PULVERIZER — increases output of fertilizer tailings . . . will not clog . . . leaves no daily accumulation of unground pellets. Capacities up to 25 tons per hour.

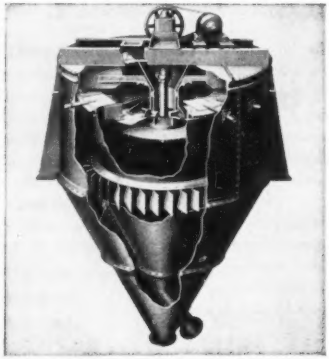


DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous mass. Open door accessibility makes cleaning easy. Capacities ¼ ton to 2 tons.

MOTO-VIBRO SCREENS — screen everything screenable. Open and closed models with or without feeders. Many types and sizes . . . screens from ½" to 60 mesh.



DEN AND EXCAVATOR — speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps.



AIR SEPARATOR — for finest separation of materials. Capacities from ¼ ton to 50 tons per hour in fineness of 40 to 325 mesh and finer. Increases production of fines, cuts power consumption costs.

Sturtevant Processing Equipment . . . Grinders, mixers, separators, screens, etc. . . . can help you *reduce* today's high manufacturing costs by increasing both machine and operator output, lowering production costs, assuring high quality products.

Records in all types of industries — chemical, plastics, ceramics, cement, food, construction — prove that this equipment works dependably day in, day out with little, if any, maintenance.

Used individually or linked together in proper sequence, they do the job faster and easier than other types . . . handle a larger variety of work.

It will pay you to investigate Sturtevant Processing Equipment for your plant. There is a size and type of machine that will meet your requirements. Write for information.

STURTEVANT MILL COMPANY

106 CLAYTON STREET
BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of:

CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS
and EXCAVATORS • ELEVATORS
MIXERS

faithfully reproduced!

In the instance of cocoanut flavor, Alva research has developed a basic formula which is obviously an improvement over similar commercial products.

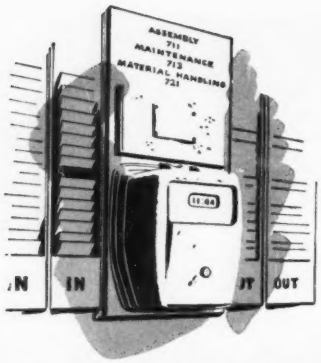
This prime Alva formula has been successfully adapted in the development of imitation cocoanut flavors specifically designed for use in candies, ice-cream, baked goods and desserts.

Samples of Alva imitation cocoanut for your paticular use will be sent on request. Let us also send you the complete Alva catalog of flavors for all uses.

VAN AMERINGEN-HAEBLER, INC.

521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS



A BOILER THAT PUNCHES THE TIME CLOCK

Yes — a Cleaver-Brooks Boiler "Punches In" to meet a heavy steam demand — "Punches Out" during low load periods.

Steam costs can eat deeply into profits when steam loads fluctuate — or are intermittent. With a Cleaver-Brooks boiler you are equipped for heavy or light . . . steady or variable loads, operating at full 80 per cent efficiency over the entire working range of the boiler.

You are assured of fuel economy through high heat transfer. *All* Cleaver-Brooks boilers are of the four pass design and the maximum useable heat is absorbed in these four passes before the combustion gases leave the boiler.

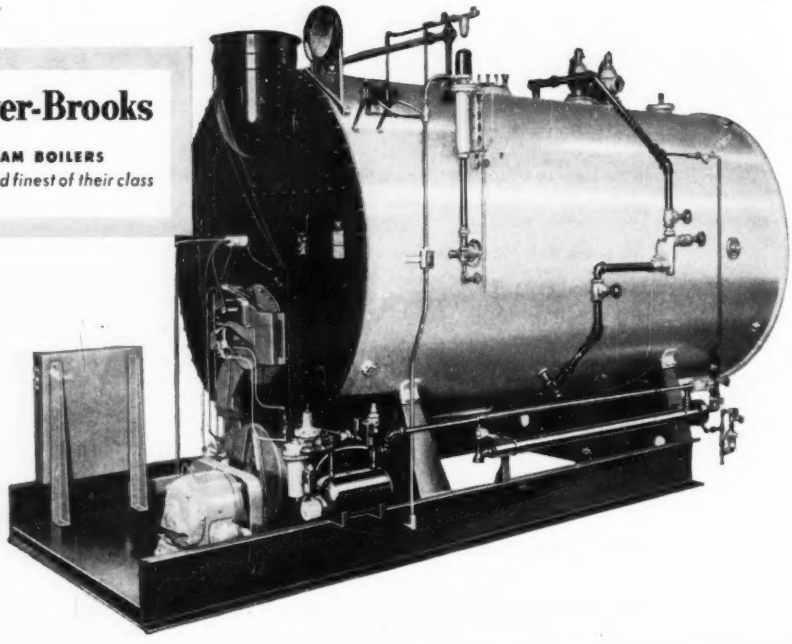
Remember the name Cleaver-Brooks if you are considering a change in your present boiler plant. Think about flexibility and get the complete facts about Cleaver-Brooks Self-Contained Boilers — standard models in 15 to 500 HP, 15 to 250 psi, oil, gas, combination oil and gas fired — 80 per cent efficiency.

CLEAVER-BROOKS COMPANY
302-A E. KEEFE AVE., MILWAUKEE 12, WIS.
Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment Oil and Gas-Fired Conversion Burners

Cleaver-Brooks

STEAM BOILERS
the first and finest of their class

Write for the latest graphically illustrated Cleaver-Brooks Boiler Catalog. It tells and shows how you can save money with a Cleaver-Brooks Boiler installation.



RIGHT IN YOUR OWN BACK YARD ...
BY WEST
MOPWELL, BEST CLEAN-UP ON THE TEAM, SHOWS THE VISITING FIREMEN A FEW TIMESAVING TRICKS ... THANKS TO LUSTRECLEAN
BURSTLY BOILER COMPANY CAFETERIA
NOW YOU SEE GENTLEMEN, LUSTRECLEAN WASHES AND WAXES IN ONE SIMPLE OPERATION ... SAVING ME HOURS EACH WEEK FOR BOWLING, TELEVISION, LOAFING AND OTHER PLEASANT ACTIVITIES ...
AND YOU'LL NOTE, I DON'T EVEN USE A SCRUBBING BRUSH ...
AND TO THINK I'VE BEEN WEARING MY MOPS DOWN TO THE HANDLE ... WHEN I COULD HAVE BEEN USING LUSTRECLEAN THAT REQUIRES NO RINSING. AND LISTEN TO THIS ... IT'S GOOD FOR WOODWORK TOO ...
LET'S BLACKBALL MOPWELL OUT OF THE BOWLING LEAGUE FOR NOT TELLING US ABOUT LUSTRECLEAN ... THAT IS, UNLESS HE BUYS THE BEERS NOW THAT HE'S ALMOST THROUGH ...
IT LEAVES A SURFACE CLEAN AS A FROZEN MILLPOND!

THE MORAL TO OUR STORY? Make the job easier for your maintenance personnel . . . and you *automatically* lower your maintenance costs. Let 'em wax as they clean—with a specially formulated material that performs 3 operations in one!

LUSTRECLEAN (pine-scented or plain) cleans . . . deodorizes . . . and deposits a light film of wax. Effective on any type of surface! No heavy scrubbing. No rinsing. Mop dry . . . buff the film lightly if a soft satiny finish is desired! Save time and labor cleaning floors, walls, woodwork—wherever excessive wear and heavy traffic has made daily maintenance a back-breaking job.

LUSTRECLEAN really cleans! Its emulsifying action loosens the most persistent dirt, grime . . . hard-to-remove rubber burns. No need to use harsh soaps or injurious chemicals. Proof? Ask for a sample and test it on the spots and blemishes your present cleaner won't remove!

Pine Lustreclean is only one of many WEST products formulated for the promotion of sanitation. Others include floor sealers and waxes . . . washroom service . . . disinfectants . . . deodorants . . . insecticides . . . cleaners . . . soaps . . . protective creams. West is the exclusive distributor of Kotex Sanitary Napkins sold through vending machines.

WEST DISINFECTING Company

42-16 West Street
Long Island City 1, N. Y.
(64 BRANCHES IN U.S. AND CANADA)

SAVE $ $ $ . . . WAX as you WASH

I'd like to try a sample of Lustreclean

Pine-Scented ☐ Plain ☐

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Dept. 8

FOR Hard-to-Start Jobs

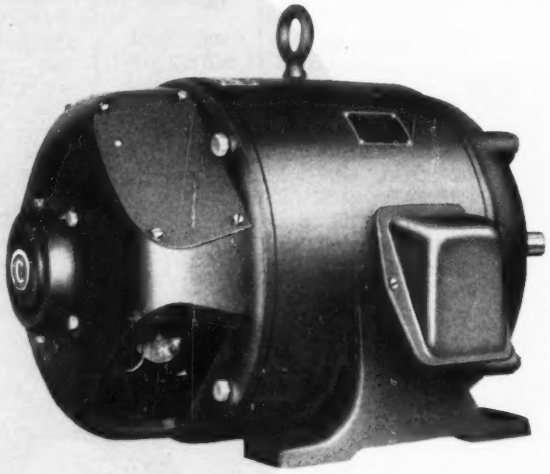
Requiring Low Starting Current

SPECIFY

Century

TYPE RS*

MOTORS



* *Single Phase, Repulsion Start, Induction, Brush Lifting Motors*

Century SERVICE

Is Near Any CENTURY Motor Driven Equipment

Century Service Is Near Any Century Motor Driven Equipment. Prompt Service is offered by CENTURY'S National Network of more than 200 Authorized Service Stations, supervised by 28 Century Sales offices.

1. Facilities for immediate exchange of most CENTURY standard ratings of standard construction are available at CENTURY Authorized Service Stations.
2. CENTURY Authorized Service Stations are qualified and equipped to service and repair any piece of CENTURY apparatus.
3. Genuine CENTURY renewal parts are available at CENTURY Service Stations, CENTURY Parts Distributors and at the factory in St. Louis.

You will find that these rugged, dependable motors meet the starting, accelerating and running characteristics of such equipment as refrigeration compressors, air compressors, stokers, reciprocating pumps, and other hard-to-start loads.

For more than 47 years, Century Type RS motors have given satisfactory service throughout the world. They are available in sizes from ½ to 20 horsepower, in drip proof and splash proof frames.

In addition, Century builds electric motors in a wide range of types and kinds—in sizes from 1/6 to 400 horsepower for operation on single and polyphase and direct current. Specify Century motors for all your electric power requirements.

ALTERNATING CURRENT MOTORS

POLYPHASE

- Squirrel Cage Induction—1/6 to 400 H.P.
- Wound Rotor Motors—1 to 400 H.P.
- Synchronous Motors—20 to 250 H.P.

SINGLE PHASE

- Split Phase Induction—1/6, 1/4, 1/3 H.P.
- Capacitor—1/6 to 20 H.P.
- Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS

- 1/6 to 300 H.P.

GENERATORS

- AC, .63 to 250 KVA
- DC, .75 to 200 KW

GEAR MOTORS

- 1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

- AC to DC, AC to AC
- DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

Century C MOTORS

CENTURY ELECTRIC COMPANY

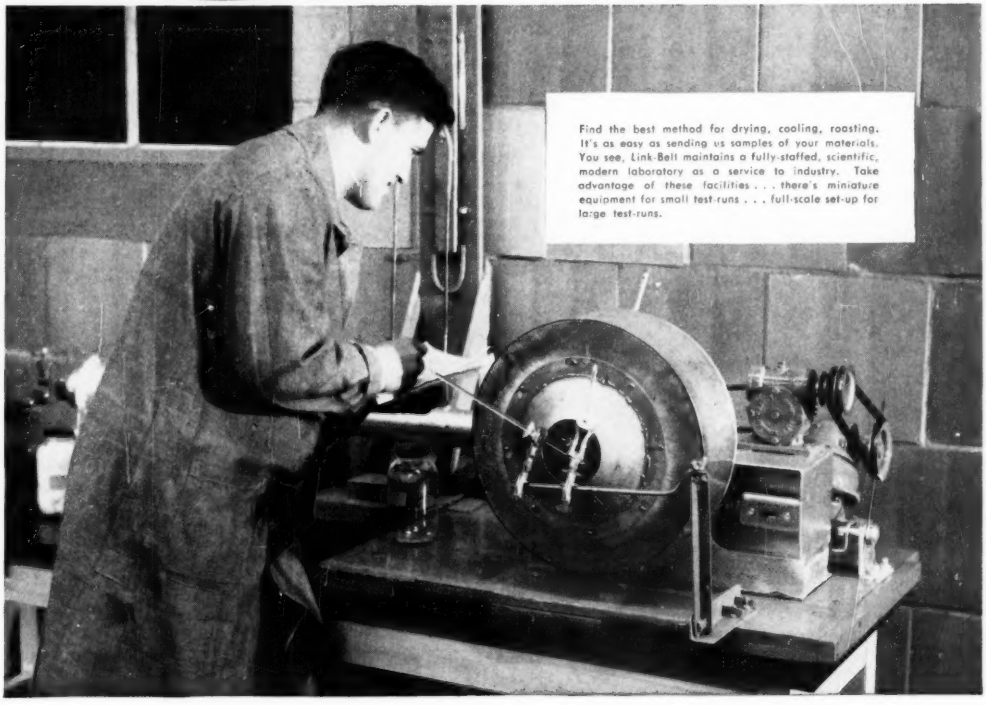
1806 Pine St., St. Louis 3, Missouri

Offices and Stock Points in Principal Cities

672

AN INVITATION
to manufacturers with drying, cooling or roasting problems...

LINK-BELT will assist in developing your process

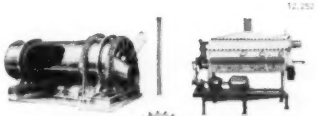

Find the best method for drying, cooling, roasting. It's as easy as sending us samples of your materials. You see, Link-Belt maintains a fully-staffed, scientific, modern laboratory as a service to industry. Take advantage of these facilities . . . there's miniature equipment for small test-runs . . . full-scale set-up for large test-runs.

Even with a small sample, we will test-run your material, work out procedures in the laboratory that can be duplicated in your plant...

Many products become marketable only after commercially practicable drying, cooling or roasting processes have been developed. That's where Link-Belt can give you the answer in advance . . . before you've spent a cent!

More than 1000 such laboratory tests have already been made. And as a result, 500 Link-Belt Dryers now step up capacity and improve quality of over 100 different products.

Ask for a test of your own materials. If you can't ship samples—ask for a unit on loan to try out right in your own plant. Why not contact your nearest Link-Belt office or plant for particulars? Now!



LINK-BELT

DRYERS
COOLERS
ROASTERS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities.

Once again....

THE NO. 1 SHOW AT...

"Vapor-Vacuum

WHITE CAP CO CHICAGO NEW YORK SAN FRANCISCO ROCHESTER LONDON ENG. WHITE CAP CO. CHIC

The exhibit for catsup packers . . . so all-inclusive as to indicate that catsup and chili sauce without Vapor-Vacuum are becoming real rarities.

The exhibit for pickle packers . . . an amazing array which demonstrates how widely the packers of pickles have agreed that *all* pickles, whether processed or cured, need Vapor-Vacuum Seals.

..ATLANTIC CITY

The exhibit for fruit and vegetable packers . . . once again an invaluable guide to new opportunities for packers of staples to step up their package appeal.

. . . . for preserve packers . . . as usual, a far-ranging assortment of the leading brands. Especially notable this year because of the big swing to the new Shallow Whitecap.

The exhibit for juice packers . . . demonstrates, as nothing else can, the swing to juice packages which open instantly, pour easily, and re-seal perfectly.

. . . and for many other packers—Whatever the product, if it's packed in glass, you'll find plenty of examples of the latest and best—systematically organized and displayed here.

If visitors to the Canner's Convention were asked to vote on the exhibits they see there, the winner, almost certainly, would be the annual Vapor-Vacuum Show!

Everybody likes the Vapor-Vacuum Show, because it's the one place on earth where the whole range of the food industry's best glass packaging is on view. (Nowhere else can you see your product so conveniently set up for direct comparison with your competitors' and others.)

So many good packers use Vapor-Vacuum that the exhibit of Vapor-Vacuum packed samples is just about industry-wide.

This year's Vapor-Vacuum Show will, of course, be bigger than ever.

We're looking forward to seeing you there!

•

White Cap Co.
Space E-4
Atlantic City

•

NO, SIR!
The Seal Won't Blow!

METALLIC-BACKED neoprene seals are used in this famous bearing — and they are engineered to *stay put.* They can't blow.

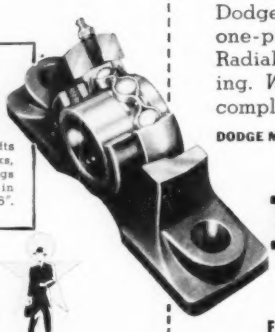
Your lubricant stays in; dust and dirt stay out; the result is years and years of trouble-free performance.

The "SC" Bearing is a new member of the Dodge 30,000 hour line. Modern styling. Rugged one-piece cast iron housing. Long inner race. Radial and thrust load capacity. Fully self aligning. *WRITE* for special "SC" bulletin, giving complete specifications.

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Ind.

DODGE TYPE "SC" BALL BEARING PILLOW BLOCK

Precision built bearing for small shafts and moderate loads. Pillow blocks, flange bearings and hanger bearings available from distributors' stocks in shaft sizes ranging from 3/4" to 2-7/16".



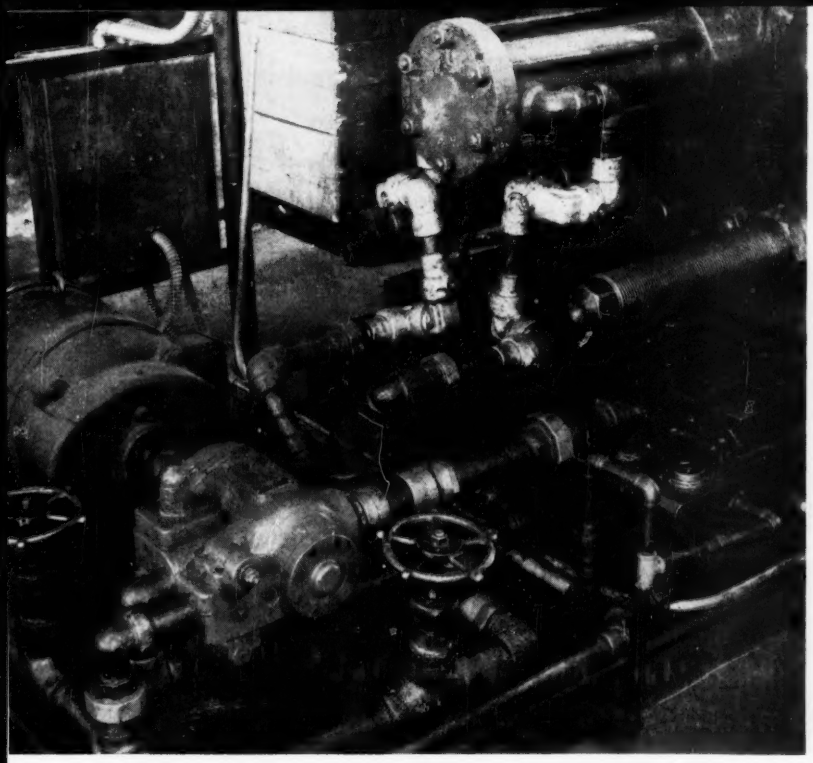
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained, he can give you valuable assistance on new, cost saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone book.

DODGE
of Mishawaka, Ind.

FIRST IN POWER TRANSMISSION MACHINERY

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT ETCHING CORPORATION, 1555 N. SHEFFIELD AVE., CHICAGO, ILL.



5 years, no change of oil

THIS midwestern die casting company called in a Standard Oil lubrication specialist when operations were started over five years ago. One of his recommendations specified the use of STANOIL Industrial Oil No. 18 in the hydraulic unit of the die casting machine shown. Now, after five years of service, this original oil is still in nearly perfect condition. There is no deposit and no varnish in the hydraulic system. There has been no need to clean the system.

This performance is typical of the results gained by STANOIL users who count on its greater oxidation stability and corrosion resistance to deliver trouble-free lubrication in speed reducers, head stock gears, auxiliary turbines, and compressors, as well as hydraulic systems.

The Standard Oil lubrication specialist in your own area can help put the advantages of versatile STANOIL Industrial Oil to work in your plant now. A call to your local Standard Oil (Indiana) office is all that's necessary. Why not do it today?

STANOIL
TRADE MARK
Industrial Oil

Standard Oil Company, 910 South Michigan Ave., Chicago 80, Ill.

What's your problem?

D. R. Clay, lubrication specialist at Standard Oil's Grand Rapids office, helped this manufacturer put hydraulic system lubrication on a trouble-free basis with STANOIL Industrial Oil.

One of a corps of such specialists, he makes his headquarters close to the plants he serves. He offers on-the-spot lubrication service that is backed by extensive experience and training in the application of modern lubricants and fuels. The same service is available to you wherever you are located in the Midwest through the lubrication specialist in your own locality.

Arrange today for a visit by this specialist. Just phone or write the Standard Oil Company office nearest you. When he calls, ask for actual performance data on these outstanding products:

SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types, SUPERLA Greases cover a wide range of operations.

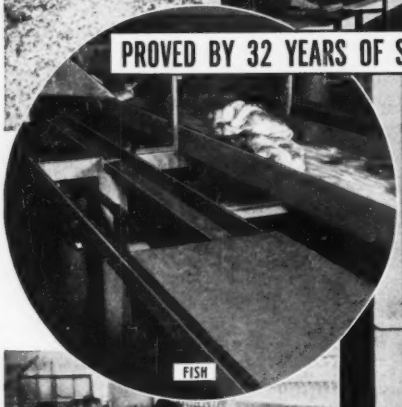
STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specially developed for its intended use. The grades range from a fingerprint remover to a heavy semi-solid that protects against corrosion for years under the most severe outdoor exposure.

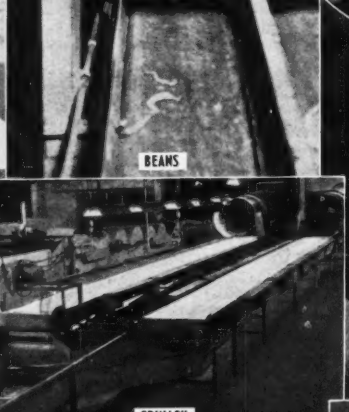
STANDARD OIL COMPANY STANDARD *(Indiana)*

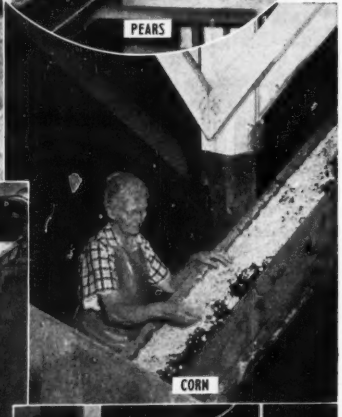
FABREEKA

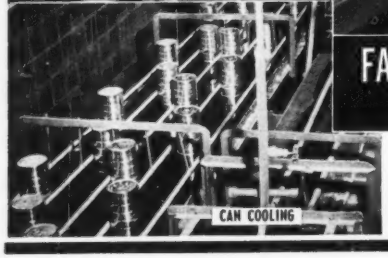
CONVEYOR & TRANSMISSION BELTING

PROVED BY 32 YEARS OF SERVICE THROUGHOUT THE CANNING INDUSTRY



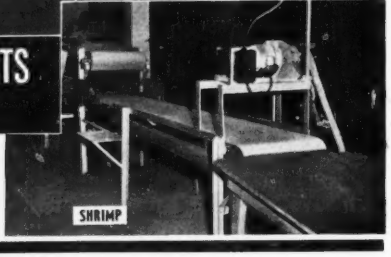






FABREEKA PRODUCTS
COMPANY
INCORPORATED

222F SUMMER STREET
BOSTON 10, MASS.
NEW YORK · DETROIT · CHICAGO
SPARTANBURG, S. C. · PITTSBURGH
PHILADELPHIA · OAKLAND, CALIF.



For 25 years U.S.P. Glycerine has helped put the eye-appeal and taste-appeal in Curtiss marshmallows. Each fluffy marshmallow is firm, never granular. There's no "weeping" or separation. Shelf life is longer. Glycerine adds freshness that you can see and feel! *With absolute safety*—proven by years of consumer acceptance.

U.S.P. Glycerine has literally hundreds of applications in food and confectionery processing. The whole story—neatly wrapped in a handy 16-page booklet—is yours for the asking.

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue
New York 17, N. Y.

8

Please send a copy of "Why Glycerine for Foods?"

Name _____ Title _____

Company _____

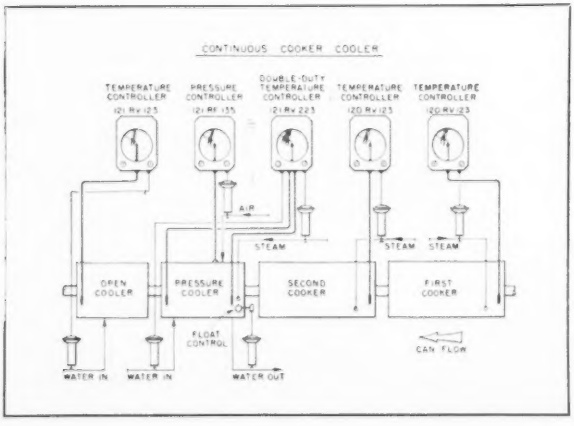
Address _____

City _____ Zone _____ State _____

CONTINUOUS PRESSURE COOKER-COOLER *under* TAYLOR CONTROL

Taylor FULSCOPE* Controllers on this continuous cooker-cooler, one of the world's largest, keep it under as complete and precise control as a conventional retort!

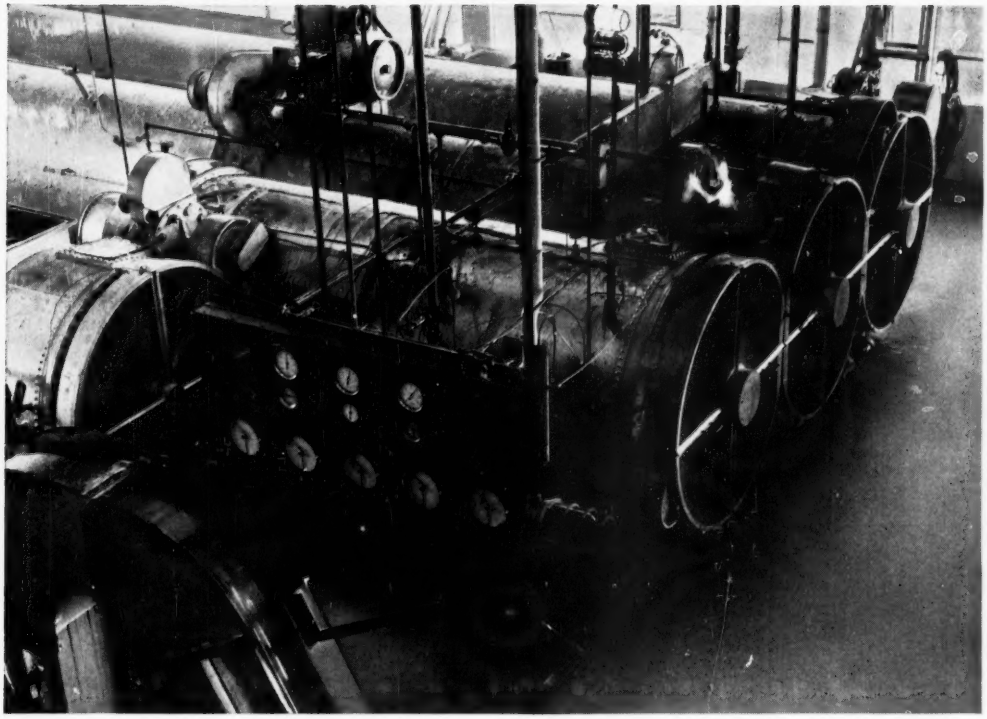
In this system both the first and second cookers are under the precise control of Taylor FULSCOPE Recording Temperature Controllers. On the pressure cooler, one FULSCOPE Controller regulates steam at the inlet, another controls cooling water at the outlet. A Taylor Pressure Controller regulates make-up air. Temperature of the open cooler is also under FULSCOPE Temperature Control.



THE RESULT: cans come out perfectly cooked, cooled, and ready for labeling. Product is completely sterilized in the shortest possible time. Spoilage due to under-sterilization is practically impossible because of double safety features. And the desired color, texture and flavor are maintained.

It adds up to increased profits, too, because steam consumption is kept

*Registered Trade-Mark



to a minimum, there are practically no rejects, and operators are free for other duties.

Your problem may be much simpler than this one. There are Taylor Instruments to cut costs and improve product quality on almost any canning process. Chances are they'll more than pay for themselves through increased profits in a single season. When you order new equipment, specify "Taylor Equipped." For help in increasing the efficiency of equipment you already have, see your Taylor Field Engineer, or write for **Catalog 500.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

* * *

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

DROP IN !

At booth C-16 at the Canners' Show.

See the latest in food instrumentation

Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

make every bit of stainless count

Wise and efficient use of available stainless steel stocks can go a long way to making sure that all defense and industry needs are met.

Getting the best available materials for your job is a vital first step—Crucible, pioneers in the development of stainless steels, urges you to take full advantage of our metallurgical staff and stainless fabricating specialists. Their wealth of experience—based on thousands of stainless applications—can help stretch your stainless supply. There is no other metal that can work the same "miracles" as stainless, and these Crucible metallurgists can help you select the best available stainless grades for your needs.

It's up to you to make every bit of stainless count—we're equipped to help you do it. When your problem is stainless—call on us.

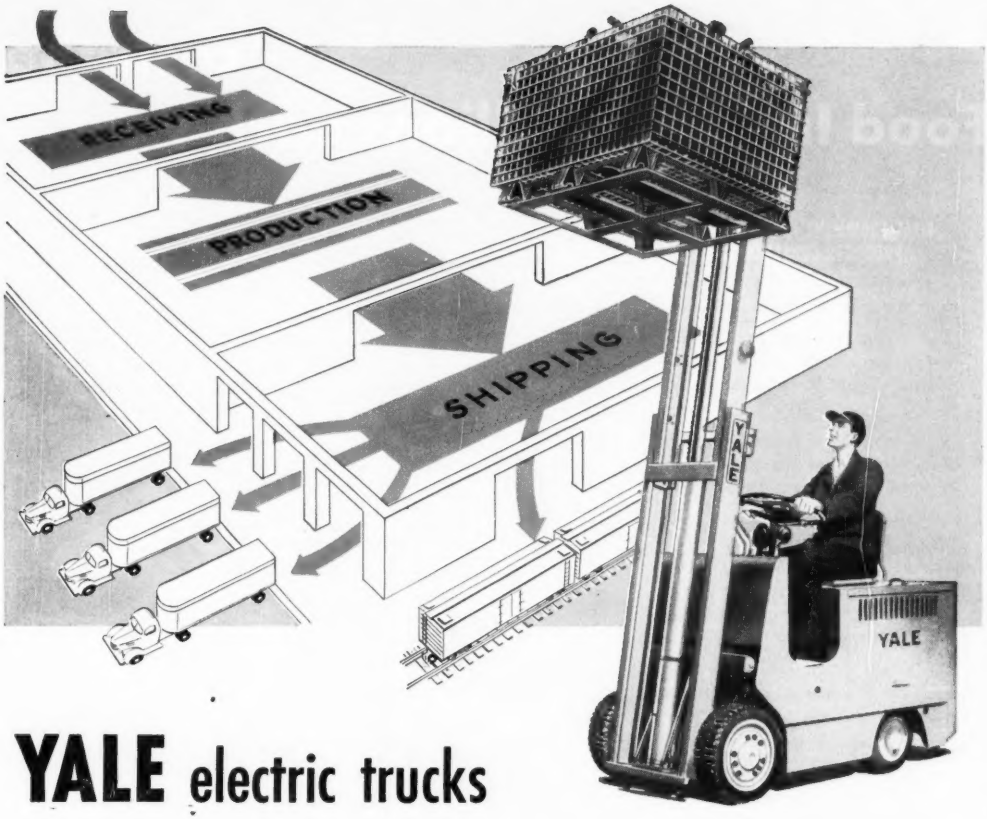
CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS



YALE electric trucks travel this route longer—*for less*

THESE EXCLUSIVE YALE FEATURES KEEP TRUCK OVERHEAD DOWN

- **Exclusive Hypoid Gears give greater drive power, longer drive life.**
- **Exclusive Involute Spline Drive Shaft, built for continuous resistance to wear-fatigue, outlasts all others.**
- **Special Rolled Lift Channels with lifetime sealed ball bearing channel rollers won't wear, won't spread—need never be replaced.**
- **Exclusive YALE design makes every part accessible for fast, cost-saving "minute-maintenance."**

YOU CAN SAVE up to 75% of your production, receiving, shipping and storage handling costs with dependable, longer-lasting YALE Electric Trucks. Discover for yourself the *extra* savings YALE Electric Trucks can bring you—in operating, maintenance and replacement costs. Fill out and mail the coupon today.

YALE & TOWNE

The Yale & Towne Manufacturing Co., Philadelphia 15, Pa.

YALE is a registered trade mark of The Yale & Towne Manufacturing Co.

MAIL THIS COUPON TODAY

The Yale & Towne Manufacturing Co., Dept. 461
Roosevelt Boulevard & Haldeman Ave., Philadelphia 15, Pa.

I want the most from materials handling savings.

☐ Please send free detailed literature on the YALE ELECTRIC TRUCK.

☐ Please have your local Representative call on me.

COMPANY_____

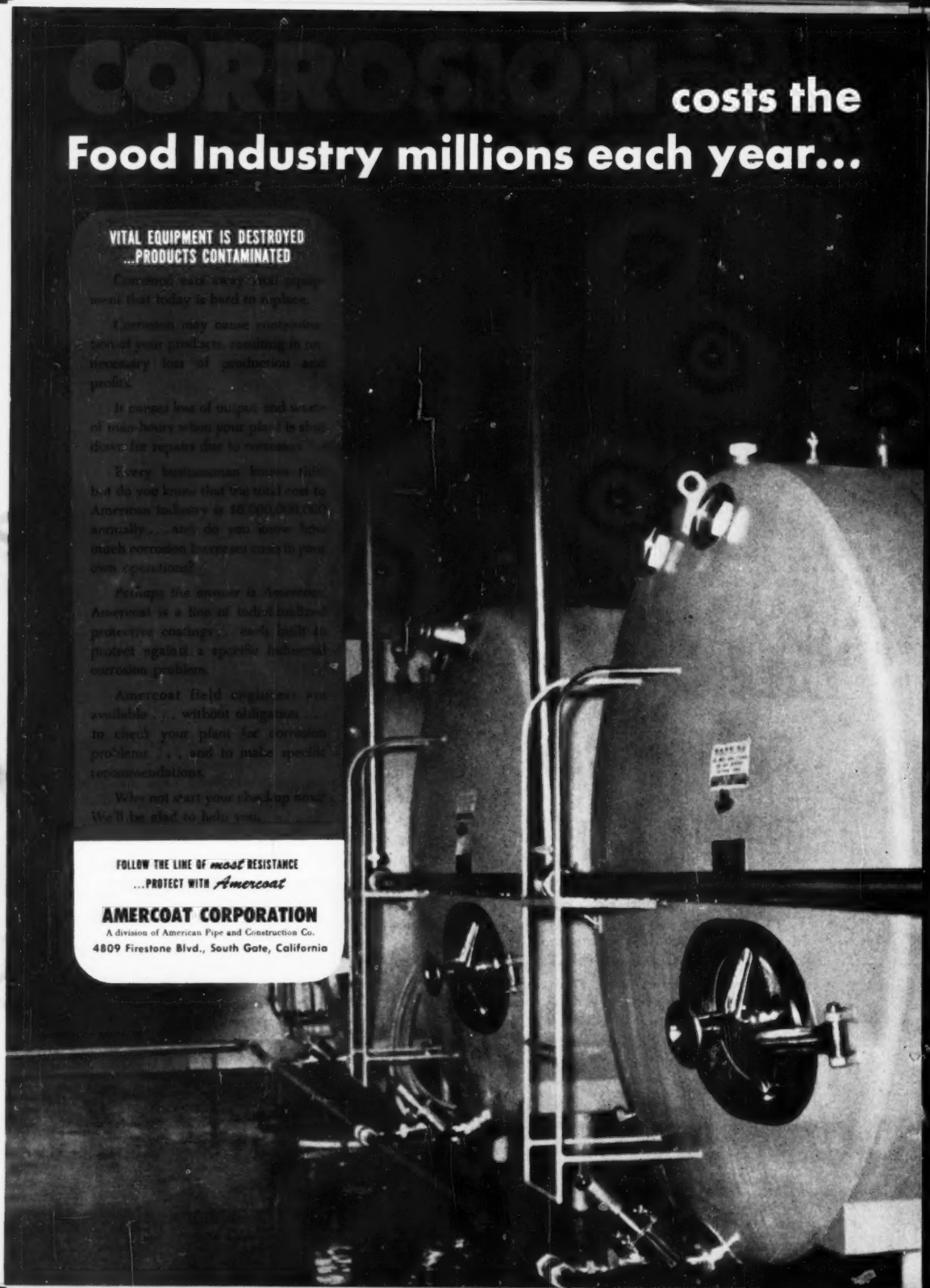
NAME_____ TITLE_____

STREET_____ CITY_____ STATE_____

In Canada write: The Yale & Towne Manufacturing Co., St. Catharines, Ont.

YALE GAS AND ELECTRIC TRUCKS • YALE *WORKSAVERS* • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

CORROSION costs the Food Industry millions each year...



VITAL EQUIPMENT IS DESTROYED ...PRODUCTS CONTAMINATED

Corrosion eats away vital equipment that today is hard to replace.

Corrosion may cause contamination of your products, resulting in unnecessary loss of production and profits.

It causes loss of output and waste of man-hours when your plant is shut down for repairs due to corrosion.

Every businessman knows this, but do you know that the total cost to American industry is $5,000,000,000 annually . . . and do you know how much corrosion hampers costs in your own operations?

Perhaps the answer is Amercoat. Amercoat is a line of tailor-built protective coatings . . . each built to protect against a specific industrial corrosion problem.

Amercoat field engineers are available . . . without obligation . . . to check your plant for corrosion problems . . . and to make specific recommendations.

Why not start your check-up now? We'll be glad to help you.

FOLLOW THE LINE OF *most* RESISTANCE
...PROTECT WITH *Amercoat*

AMERCOAT CORPORATION
A division of American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

a little $\frac{1}{10}$ saves a lot

As little as one-tenth of one per cent of Monsanto Sodium Benzoate will protect many food products from spoilage. It is a time-proved preservative that guards quality while your products travel from plant to customers' tables.

Like other Monsanto Chemicals for food use, sodium benzoate is manufactured under strict laboratory control. It is among the purest chemicals produced in commercial quantities, assaying 99.0%. Monsanto Sodium Benzoate is available as flakes or powder, so you choose the form more suitable to your processes.

If you use a preservative, you will find interesting and helpful information in Monsanto's 16-page booklet, "*Benzoic Acid and the Benzoates.*" A copy will be mailed to you *free* upon request to the nearest Monsanto Sales Office or MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

SODIUM BENZOATE

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

DISTRICT SALES OFFICES:
Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

Life-Linestarter
PAIRED FOR PRODUCTION
Life-Line motor
ON
TRIPPED
OFF
RESET
OPEN COVER
WESTINGHOUSE
DO NOT LUBRICATE

FREE maintenance men for other important jobs with these two

Why nurse motors and controls? This pair stands on its own feet . . . takes the increased production rate without "babying". For example: Life-Line motors need no lubrication . . . free men for other maintenance duties. Just install Life-Line and forget them. Life-Linestarters® cut maintenance, too. You can take one apart with a screw driver—in two minutes. One single moving element. No sliding members . . . nothing to stick or jam. These features pay off. Take the case of an eastern plant, for example:

They installed ten new punch presses. Shortly, motor overheating and burnouts resulted. A check revealed lack of lubrication as the trouble. Motors installed fourteen feet above floor level were "forgotten".

Life-Lines have replaced these troublemakers. Result? No more outages. Motors are still forgotten—but safely. They *need no lubrication.*

How about the starters? Many times vibration or a sudden shock from the press caused ordinary starters with gravity-type operation to open. This stopped production. But with the Life-Line-starter, faulty operation is a thing of the past. The inverted, clapper-type design will not open from shock or vibration.

Here is but one example from many where Life-Line motors and Life-Linestarters paid off on the production line . . . freed maintenance people for other duties.

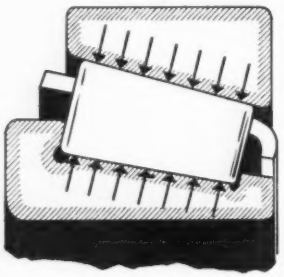
Why not take advantage of this Life-Line production team? It costs no more. A check with your Westinghouse representative will give you the complete facts on each. Ask him for copies of "Life-Line Motor Book", B-3842 and "Tomorrow's Starter Today", B-4677. He has copies for you. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-21628

YOU CAN BE SURE.. IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

6 problems you can solve with TIMKEN® bearings

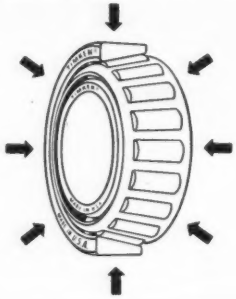
HEAVY LOADS

Loads carried on the rollers and races of Timken® bearings are spread evenly over a line of contact. The greater load area assures extra load-carrying capacity.



COMBINATION LOADS

Due to their tapered design, Timken bearings carry radial and thrust loads in any combination. No auxiliary thrust bearings or plates are needed.

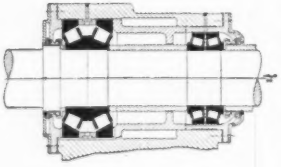


PRECISION

Timken bearings hold shafts in positive alignment, prevent end-movement, minimize deflection. Gears mesh precisely, assuring a smooth flow of power.

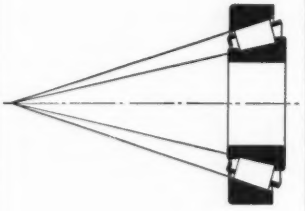
MAINTENANCE

Closures are more effective because Timken bearings keep housing and shaft concentric. Dirt and grit are kept out. Lubricants are kept in.



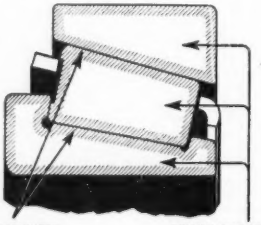
FRICTION

Timken bearings roll freely due to true rolling motion. Lines coincident with tapered surfaces of rollers and races meet at a common point on the bearing's axis.



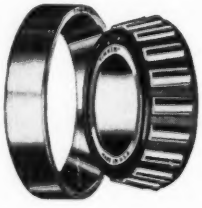
WEAR

Rollers and races of Timken bearings are made of Timken fine alloy steel—case hardened for a hard, wear-resistant surface and tough, shock-resisting core.



Be sure to specify Timken roller bearings for the machines you buy or build. Look for the trade-mark "TIMKEN" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ⊕ AND THRUST ⊕ LOADS OR ANY COMBINATION ✳

NEW, IMPROVED METHOD TO

SLASH YOUR "BRIGHT" CAN WAREHOUSING COSTS

NEW, PLANT-PROVEN PALLETIZING AND DE-PALLETIZING EQUIPMENT PRESENTED BY STANDARD-KNAPP SPEEDS "BRIGHT" CAN HANDLING, REDUCES ALL COSTS.

● Here's the solution you've been seeking to the problem of how to handle "bright" can warehousing efficiently and economically. Now you can really beat costs down until they're shadows of their former selves.

● This new equipment takes the cans after cooling, collects them according to pallet size, and loads them onto the pallet, tier upon tier. Then, as required, the de-palletizing unit removes the cans from the pallet and delivers them through a converger in single file for labeling and casing.

● It's plant-designed, plant-proven equipment. Hawaiian Canneries, Inc., who developed it, has been operating such equipment for several years. Performance has been — and is — outstanding. We're proud that we can make this equipment available generally to the canning trade.

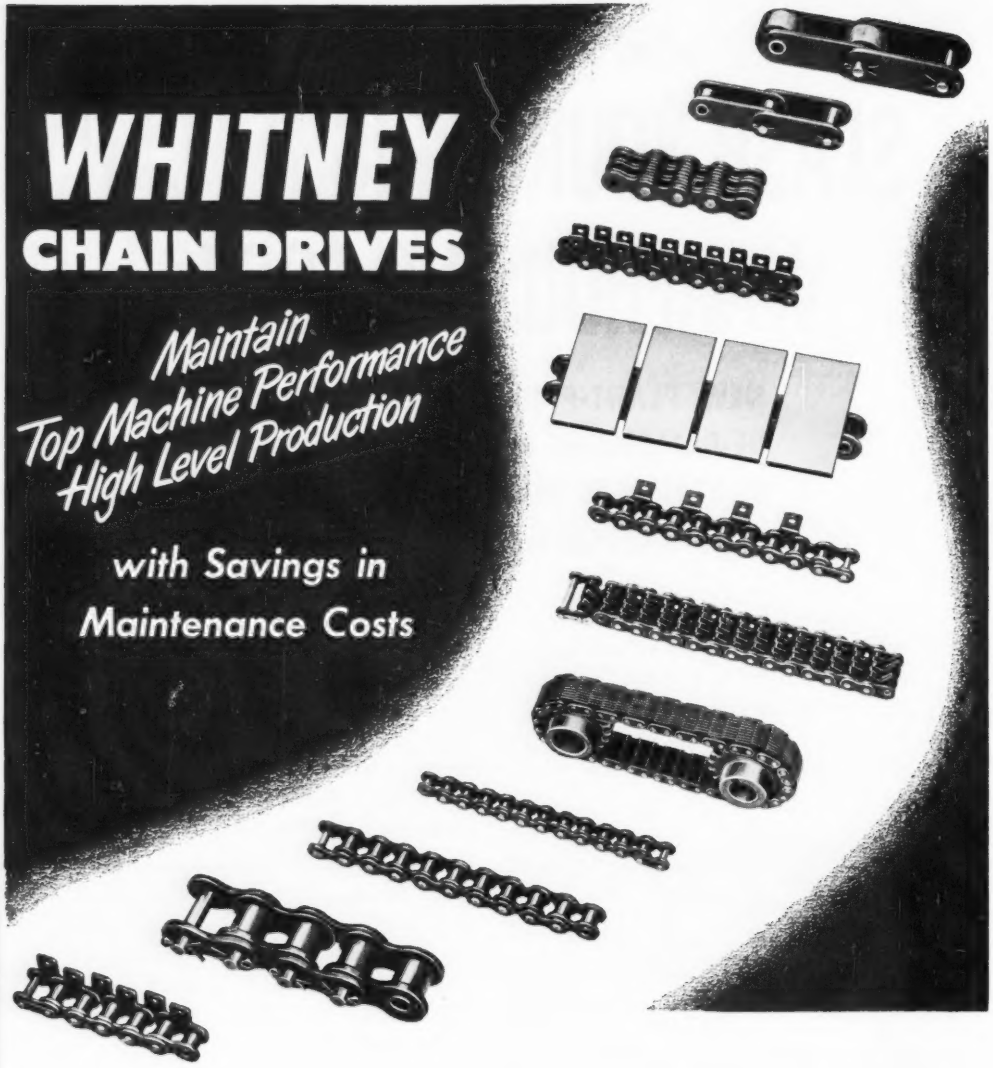
● Let us give you complete details on its many advantages . . . how it speeds "shiner" handling, permits expanded production without enlarging warehouse space, eases the operator's job, detects leakers and prevents stack spoilage. See us at the show.

STANDARD-KNAPP
DIVISION OF EMHART MFG. CO.
PORTLAND, CONNECTICUT

WHITNEY
CHAIN DRIVES

Maintain Top Machine Performance High Level Production

with Savings in Maintenance Costs



If you have a problem of positive power transmission, conveying of bottle or packaged goods, transferring bulk materials, split second timing motions, reversal of direction, Whitney Chain Drives will provide the solution with important savings in time, dollars and maintenance costs.

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From the complete line of Roller, Silent and Conveyor Chain Drives, Whitney engineers can recommend, without bias, the proper type of drive for each application . . . the chain drive which gives you the best service at lowest cost.

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If you will put a Jenkins Valve, recommended for your particular service, on the worst place you can find — where you cannot keep other valves tight — and if it is not perfectly tight or it does not hold steam, oil, acids, water or other fluids longer than any other valve, you may return it and your money will be refunded.

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A FAIR OFFER THAT HAS BEEN IN EFFECT SINCE 1869

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864
TRADE JENKINS MARK
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Food processing as we know it was unheard of when Jenkins "Fair Offer" was first published. Probably no other industry has provided such a test of valve efficiency and endurance. The very fact that "Fair Offer" has been published again and again through the years is convincing evidence that Jenkins Valves have "met the test" in this as in *every* type of service. Jenkins Bros., 100 Park Ave., New York 17. Jenkins Bros., Ltd., Montreal.

Coming to Atlantic City?

You are cordially invited

to visit with us at the Canco booth in Convention Hall during the Canners' Convention.

We'd like very much to sit down with you to swap ideas, talk old times and new, and discuss your problems too, if any. Stop in, won't you?

You'll be welcome at Booth No. E 13

AMERICAN CAN CO.

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NEW YORK
CHICAGO
SAN FRANCISCO
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Convention of Canning Machinery and Supplies Assn.,
Convention Hall—Atlantic City, N. J., January 19-23, 1952

the RIGHT gear ratio for load, road, and type of service

means more and faster trips, lower cost, longer truck life

EATON 2-Speed Axles *double* the conventional number of gear ratios, giving drivers a *right* ratio for every operating condition—on the highway, or off, starting out under full load, climbing grades, highballing, quick shifting in traffic. Engines run in the most efficient and economical speed range, reducing stress and wear on engines and power transmitting parts; adding thousands of miles to vehicle life. And Eaton Axles last longer because exclusive planetary gearing better distributes gear tooth loads. The exclusive Eaton forced-feed oiling system provides positive lubrication at all vehicle speeds. Ask your dealer to show you how Eaton 2-Speeds will help *your* trucks haul more, faster, longer, at lower cost!

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Axle Division
EATON MANUFACTURING COMPANY
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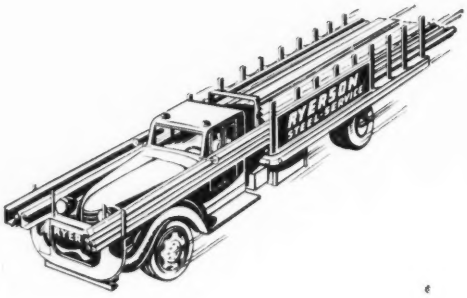
PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

RYERSON

Ryerson Steel Service awaits your call at thirteen great plants, strategically placed across the nation.

STEEL

Every kind of steel is on hand for quick delivery. Though stocks are currently unbalanced, most requirements are usually available.



SERVICE

Ryerson representatives are ready to assist you on any problem involving the purchase, fabrication or application of steel.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished
STRUCTURALS—Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate
SHEETS—Hot and cold rolled, many types and coatings
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BABBITT—Five types, also Ryertex plastic bearings
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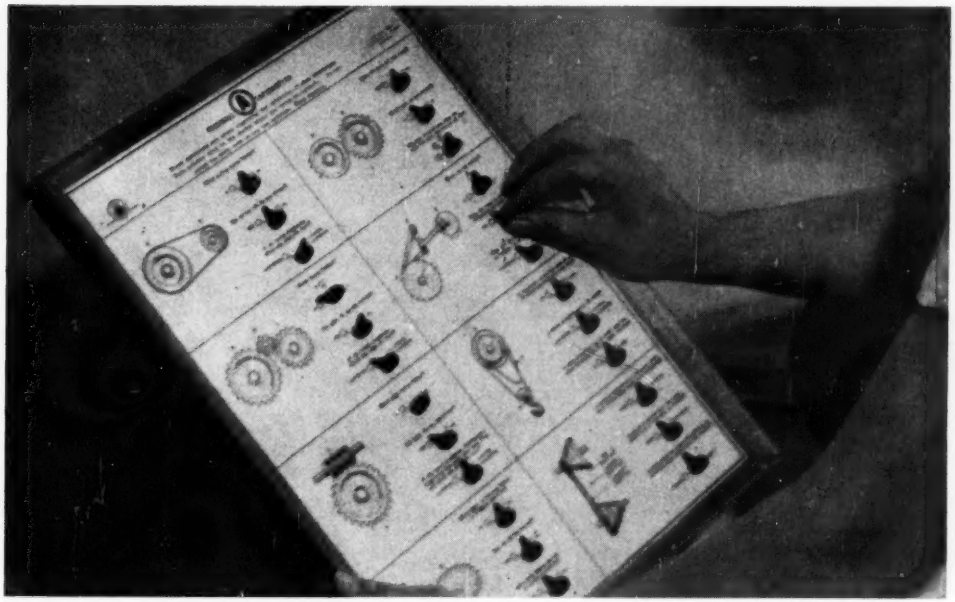
JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO



CLOSEUP as prospective supervisor takes mechanical aptitude test on Kopas-designed board, which can be scored rapidly. Multiple-choice answers are offered. Various boards are available to gage different abilities.

Planned Hiring Program

"Puts Square Pegs *In Square Holes*"

Crack workers can be recruited when your help-wanted notices are solidly backed with concise job analyses, prepared interviews, mental and physical tests and sound evaluations . . . Here's how

DON F. COPELL

Vice-President, Engineering & Training Div., Wagner Baking Corp., Newark, N. J.

Careful selection and intelligent placement of personnel can spell the difference between success and failure in your business.

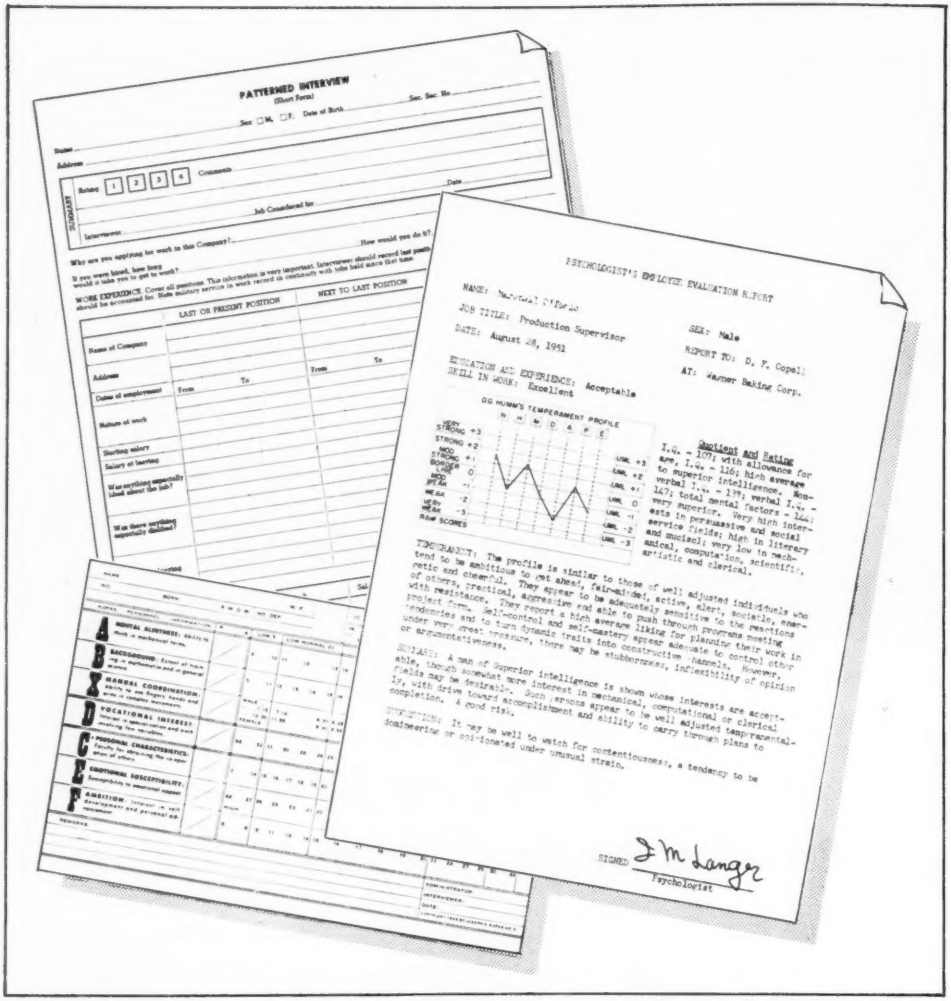
How to obtain such selection is the problem. And the solution lies in rapidly and accurately analyzing prospective employees in a systemitized hiring procedure.

Through such an established vehicle, you can—

- Screen out those unfit for a particular job.
- Discover hidden talent and capabilities—important in deciding future promotions.
- Be protected from serious errors of choice due to (1) personal impressions, or (2) pressures from friends or associates.
- Establish better human relations between management and the individual employee.
- Place each employee in the job for which he is best suited.
- Identify those who have psychological problems—persons who are maladjusted, who tend to be "troublemakers", or who are heading for nervous breakdowns.

In spite of the complexities of the human personality, the task of making a scientific, impersonal, unbiased, yet objective, appraisal of how an individual *can and will* function in a job is a rather simple, though time consuming, procedure. An hour spent in the selection, analysis, and evaluation of a prospective employee, or an employee considered for promotion, undoubtedly will go far toward

Measure of the Man



REPORT FORMS like these, when carefully evaluated, contribute to sound personnel selection. The psychologist's report and patterned interview indicate intelligence and temperament, while the Kopas Personnel Information Card (left) summarizes results of the aptitude-board tests.

eliminating one of the costliest of inefficiencies—wasteful utilization of human resources caused by misplacement and poor morale among key men.

Hiring Can Be Organized

Problem in every business is to find individuals with the combination of commercial assets known as the *ability to work* and the *will to work*.

Another pertinent sidelight on this gage of work is offered on a plaque hanging in the front office of an Omaha poultry packer. It is inscribed: "Anyone who enjoys working can have a hell of a good time in this organization."

A lot of delicious chicken is made out there. Through careful selection of birds, by inspecting and packing matched pieces of select chicken, and using a well-seasoned gravy, this company guarantees a quality product. And, watching such highly efficient processing, an observer might well wonder how it was possible to fit workers, supervisors, and employers so neatly together in an atmosphere of efficiency complemented with excellent human relations.

Now, how should a plant go about obtaining such smooth action?

Experience bears out that the right selection and placement of employees or supervisors to assure a homogeneous, hard hitting, efficient organization, calls for a hiring routine that includes these well-known tools and technics:

1. Proper job description
2. Effective application blanks
3. Personal interviewing and basic rating
4. Analysis and evaluation of application blank
5. Aptitude and temperament tests

6. Physical examination
7. Reference follow-up
8. Discussion and evaluation
9. Proper placement
10. Proper training
11. Follow-through and follow-up.

First and foremost, we must have a detailed description of the job to be filled—just as we require specifications for materials used.

The more complicated the job is, the more details we need. A job description is a blueprint of requirements, to be filled the same as a prescription. It is as important in *good* selection as a blueprint is to an architect.

Adapting Routine to Conditions

Having formulated our job descriptions, we are now ready to receive applicants and can have them fill out applications.

Through the American Management Assn., National Assn. of Manufacturers and National Industrial Conference Board there are available samples of time-tested application blanks and excellent descriptions of hiring methods. From these you can select the one best suited for your business, or develop your own to include the type and amount of information you want.

Naturally, the hiring procedure for hourly workers or routine workers will be far simpler than that for hiring supervisors or promoting employees to supervisory positions.

In any case, it is of utmost importance to make the applicant feel at ease and to show him every courtesy, since first impressions can be lasting.

Proper application blanks well filled out, careful analysis of the information so obtained, and thorough interviewing comprise one phase. Aptitude testing is the other in scientific personnel selection.

Test scores are measurements and indications. Each special score must be interpreted in the light of all the others and with due consideration of every bit of valuable information obtained through interviews and investigations of the applicant.

Testing reveals to the employer the probability of success or failure of a prospective applicant *before* employment. Certain undesirable traits that are likely to spell failure or trouble show up clearly in aptitude tests.

Observations covering general plants indicate that about four out of every ten hiring actions proved to be mistakes. Often the mistakes started with the original interviews and ended in the misplacement of individuals.

Tests reduce bad selections and improper placements to a minimum—by providing information about a person which otherwise might not be brought out for a year or more of acquaintance. Results should be entered on the application blank or be attached to it.

After the results are analyzed, classified, and compared against the job description, the applicant should be given a thorough physical examination. Results should be discussed with the physician, who should have a copy of the job description.

Thorough Tests Tell

The basic tests we use at Wagner Baking (developed by Joseph L. Kopas, of Fenn College, Cleveland) consist of a series of test-boards and a dexterity routine requiring wrenches and screwdrivers. These tests are easy to handle and simple to score.

Different sets or combinations of test-boards are used for different jobs—such as a gage of shop mathematics for mechanics, or blueprint-reading for crafts. Grammar or clerical ability is measured in the case of office help, while prospective mixers or cooks may thus be examined for skill pertaining to their particular jobs.

Generally in choosing an employee—especially a supervisor, a potential manager, or a candidate for a highly technical position—we want to know the following—

1. Has he sufficient *product and process knowledge?*
2. Does he possess the required *mechanical knowledge and ability?*
3. Can he obtain *cooperation* of others?
4. Is he *mentally honest?* In short, does he always give the full story, or does he omit or conceal facts which may be unfavorable to his position or contention?
5. Has he shown ability to *distinguish* between facts and opinions, causes and effects, and keep them separate in his mind?
6. Has he the ability to *think ahead* in his daily job—that is, to plan?
7. Can he give *clear* explanations and instructions to others?
8. Can he *analyze* a situation and make a report and recommendations on it?

Hourly Workers Hiring Routine

(Applicants may be rejected at any juncture)

A. Prospective employee fills out general application blank. He is informally interviewed.

B. He is given basic series of tests . . . These are rated and discussed.

C. References are checked by phone, mail, and personal contact. . . Physical examination follows, and results are checked with doctor and related to job description.

D. Applicant is given second interview and shown through plant . . . All forms and results are evaluated, and opinions of other supervisors are solicited and weighed.

E. Decision is made whether to hire or reject applicant.

Supervisory Personnel Hiring Routine

(Applicants may be rejected at any juncture)

A. Prospective employee fills out general application blank. He is informally interviewed.

B. Patterned interview is given.

C. Rating is checked and additional information obtained if needed.

D. Basic series of tests is given, then followed with specialized tests . . .Results are rated and discussed.

E. References are checked by phone, mail, and personal contact . . . Physical examination follows, and results are checked with doctor and related to job description.

F. Applicant is interviewed by prospective immediate supervisor . . . All forms and results are evaluated, and opinions of other supervisors are solicited and weighed.

G. A management group then confers with candidate . . . Results and opinions are compared.

H. Decision is made whether to hire or reject . . . if accepted, new employee is inducted, introduced, briefed, and trained . . . Progress follow-up is further step after suitable period.

Job Specs for Wagner's Production Supervisors

Education and Specialized Knowledge: **High school graduate. Able to make out reports as well as analyze their contents. Preferably American Institute of Baking or Dunwoody graduate.**

Past Experience—What and Where Acquired: **One to two years in pie or other pastry baking. Laboratory experience desirable.**

Resourcefulness: **Independent judgment required in making up schedules, devising methods, developing new products, and handling employees.**

Cooperation and Personality: **Must cooperate and obtain cooperation. Must have agreeable pleasant personality, and be tactful yet forceful.**

Duties: **Work is of high importance and can only be partially routinized. Involved are many specialized duties. Job requires keeping in touch with sales department.**

Mental and Physical Demand: **Most of the time spent standing or walking. Must also operate equipment occasionally. Hours irregular, at times some night and Sunday work.**

Working Requirements: **Must continuously be in shop which is wet and dusty at times.**

Supervision Requirements: **Must have supervisory talent to direct all types of labor—40 to 50 people—in fairly complicated work.**

Policy: **Must use some judgment in relaying or interpreting instructions.**
Methods: **Is to follow standard procedures. But development of better methods is part of job.**

Records and Reports: **Such records as inventories, production reports, and production schedules are fairly complex, but routine in nature.**

Physical Requirements: **Minimum height, 5 ft. 8 in.; Minimum weight, 120 lb.; Age limits, 25-50; Sex, male, Strength, normal; Fatigue, normal; eyesight, good; Others, none.**

9. Has he shown ability to *carry a job through*—accomplish what he has set out to do?

10. Has he sufficient *knowledge of costs* to be able to analyze and control them?

11. Is he *physically, mentally, and emotionally fit* to be an active, reliable, tactful, stable, and practical leader?

Additional tests will help determine to what degree a person possesses the above qualifications.

When ability is measured, we find out what a man can do, but we have no knowledge of what he *will do*. The following additional tests, which are administered by us, but interpreted by a trained psychologist, are designed to check this phase:

1. Wonderlic Intelligence Test; 2. California Mental Maturity Test; 3. Kuder Preference Record *or* Cleeton Vocational Interest Test; 4. Humm-Wadsworth Temperament Scale *or* Benreuter Personality Inventory; 5. Bennett's Mechanical Comprehension Test for Mechanics; 6. Psychological Corp General Clerical Test for Office Workers *or* NOMA Office Tests; 7. Cardall Tests of Practical Judgment; and 8. Special tests for special conditions as recommended by psychologist.

While we do not entirely abide by the recommendations of the psychologist, and often prefer to use our own judgment based on information obtained through the interview, this outside and professional analysis has been most helpful and reliable.

The analysis of such factors as temperament, ability to get along with people, and judgment, are not precise, concrete measurements—because what is involved in getting along with people in a slaughter house may be entirely different from what it is in, say, a pie foundry.

Again, mere "getting along" does not necessarily assure optimum results. There is also the need to get things done.

Another thing: Mere possession of a college degree or a high I.Q. is no

(*Turn to page* 191)

Challenging Factors—But They Can be Resolved

No longer, states Author Copell, can personnel factors be subordinated to the considerations of machines and materials. Today, the effective use of physical resources depends upon management's skill, and sincere desire to employ human resources most effectively.

The development of better relations between management and labor cannot be left to chance. These must be promoted much like new products—by establishing a need, developing the solution, continuously improving upon the method, and informing the people involved concerning the what, the how, and the why.

This scientific approach, however, is complicated by modern industry's intricate structure—making it advisable for personnel officers to consider the following factors when determining policies affecting employee relations—

1. Mass production has brought about a lessening of personal contact between the employer and the worker.

2. The worker no longer produces finished things with his own hands, thus there has been a decrease in personal pride of work, and, to some extent, a lessening of personal security.

3. Today's factory man has more free time to enjoy the fruits of his labor. Consequently, he craves more things that will help him enjoy his leisure time.

4. There is little individual recognition for the worker when a job is well done, and little opportunity for individual thinking on routine jobs.

5. Far too often the employer is viewed as "a social burglar whose sole purpose is to grind out big profits by squeezing as much as possible out of the worker."

6. The state of the world today tends to make people more skeptical than ever before. They are influenced to a very great extent by emotional appeals rather than factual arguments.

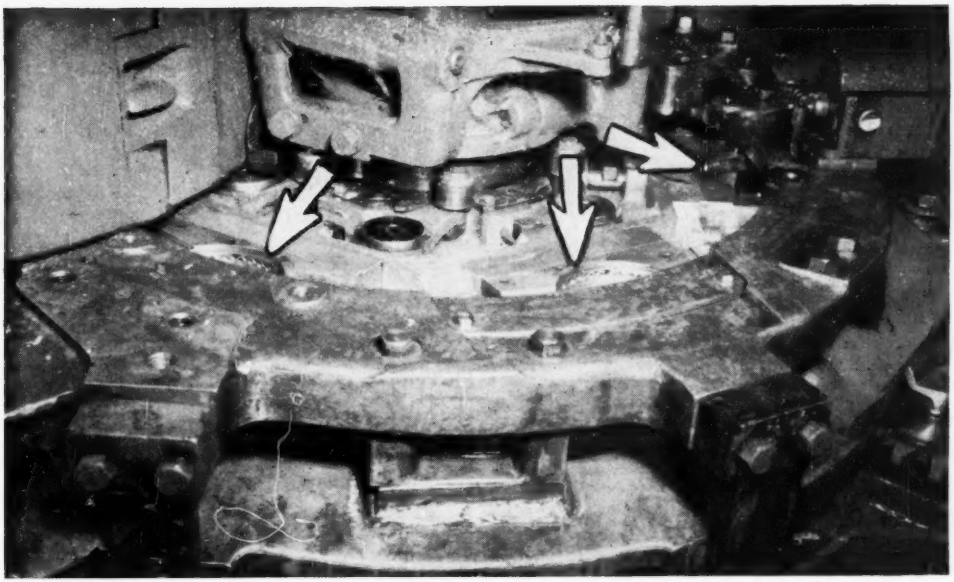
Basically, however, unhappiness, restlessness, and low morale among employess are caused by—

1. Giving them tasks which are beneath their physical or mental capacity—not allowing them to utilize their full abilities. Thus, they develop a "held-back" complex.

2. Assigning them to work beyond their capacities.

3. Failing to recognize the great variance in make-up and background of people—and accordingly failing to mold them into harmonious and efficient working teams.

The many factors are challenging. But, declares the author, use of revealing interviewing and testing methods—such as considered in this article—can go a long way toward resolving them.



BUSINESS-END of nitrogen system is at can closer. Gas-jet openings (arrows) can be seen just below can-lid rest in each closer pocket. Gas flow to orifices is controlled by cam-operated valve.

Small Plant's Successful Technic for

Gas-Purging Canned Goods

Simple and efficient safeguarding of quality and low operational cost highlight packing progress at Midwest cannery that installed nitrogen gas can-closing system

A. M. CHRISTENSON

Manager and Owner, Onekama Packing Co., Onekama, Mich.

Straightforward engineering in the design and installation of a nitrogen purging system at our Onekama Packing Co. cannery has provided us with an extra safeguard for our product.

Designed to eliminate headspace oxygen from cans, the technic has been most successfully employed at our plant—a small sour-cherry cannery. It has proved to be dependable and economical in commercial operation.

We worked with both the Linde Air Products Co. and the American Can Co. in developing the process as it is now applied in our Michigan plant. Laboratory tests had indicated that by eliminating oxygen from canned cherries, their color and quality would be preserved to a very high degree.

Today, with more than a year's full-scale operation behind us, we have reached these conclusions:

- **The technic is easily applied, requiring only a small investment and little specialized training.**
- **Nitrogen packing is not overly costly, adding about 1½ c. per case of 2's.**
- **In production runs, headspace oxygen can be cut to 1 percent or less.**
- **Gassed cherries have better color and flavor than those canned in the regular manner.**

No basic change in the regular canning line is needed to install nitrogen purging. The standard closer is simply replaced with an identically shaped, but modified, Canco 400 machine—designated as type CGF—which performs the actual gassing operation as well as can sealing.

The modified closer is equipped with a supply pipe that feeds nitrogen to the inside column of the closer. Ports then distribute the gas to each pocket in the closer turret. Holes are located just below the can-lid rest ledge in each pocket, and gas is jetted through these—directed under each cover before closing.

Gas flow is controlled by a cam-operated valve. This valve opens shortly before the can and cover reach the assembly station and while the cover is supported 5/16 in. above the flange of the can. Nitrogen then flows until the lifter has raised the can and cover into the seaming head.

A system of protective devices assures efficiency and dependability in

the gassing operation. If the machine is set for gassing and the main nitrogen supply valve is shut, the closer will not run—due to inactivation of a micro-switch. Another micro-switch will shut down the unit when closer lid supply is low. And a pressure switch on the gas supply manifold will stop operations if nitrogen supply pressure is excessive or weak.

Gas In Cylinders

Nitrogen for the process is supplied under high pressure in standard cylinders. These cylinders are set up in two banks—five in each—and connected to a main feeder manifold. Gas pressure is reduced by Oxweld Regulators permanently mounted on the manifold. Usually, each side is operated alternately, with replenishment of the exhausted bank while the other is in use. However, if desired, both may be used simultaneously to meet heavy demands.

Extensive tests by both Linde and Canco engineers indicated that 0.025 cu.ft. of nitrogen per No. 2 can would be required to reduce headspace oxygen to the 1 percent range. Therefore the total volume of gas flow is critically dependent on the peak rate of cans sealed in any given minute.

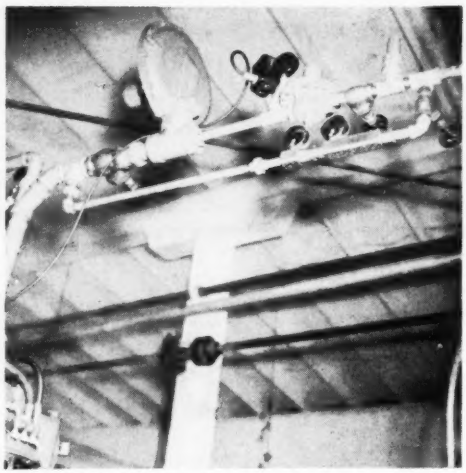
To govern the desired gas rate, we installed an Oxweld L-21 Critical Flow-Meter in the supply line. This measuring device establishes a fixed flow of gas through the feeder pipe in accordance with the size of its changeable orifice restriction. Supply pressure from the manifold regulators to the meter is 60 psi.

Simple Training Involved

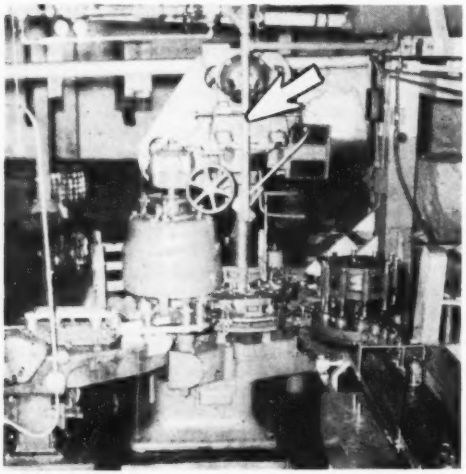
Comparatively little special maintenance or training is required for the gassing system. The closing ma-

Tracing Nitrogen From Cylinders to Can Closer

TWO HIGH-PRESSURE nitrogen cylinder banks furnish inert gas to system through single main feeder pipe.



CONTROL SYSTEM regulates gas pressure to can closer, controls flow volume, and safeguards against low gas.

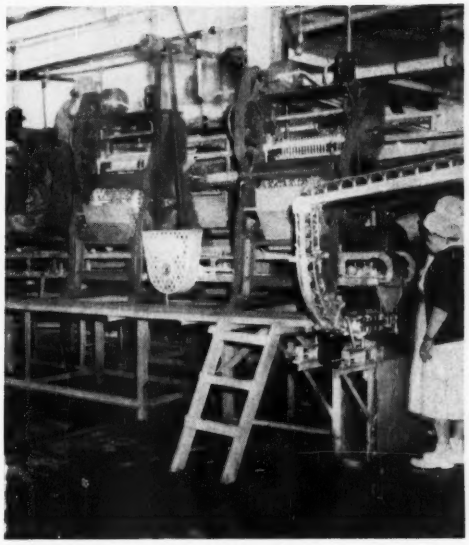


NITROGEN supply pipe (arrow) enters modified closer at center column. On cam line, note tampers for cherries.

HEADSPACE oxygen in closed cans is frequently checked with special Orsat apparatus to regulate operation.

Brief "Run-Through" on Model Plant's Line

SOUR RED CHERRIES are "firmed" for pitting by circulating cold water through them in these iron tanks.



TWIN PITTER lines have a throughput of 6 tons per hour. One man services this station of six Dunkley machines.

Onekama Packing has been dubbed "first rate" in the small cannery field. It cans sour cherries at better than 8,000 No. 2's per hour in its spick-and-span Michigan plant.

It's production line is conventional—except for the recently added nitrogen purging system.

Cherries arrive in 27-lb. lugs and are immediately cooled and firmed in circulating cold water. Eighteen tanks are used for this operation taking 8 to 12 hr.

The tanks are discharged of their fruit in sequence—via flumes through gate valves into troughs. An elevator then lifts and delivers the cherries to an eliminator and stemmer, where fruit smaller than ½ in. is rejected. Sorting follows at two stations where twelve girls are stationed.

Graded fruit proceeds to the pitters—six Dunkleys used to provide a capacity of 6 tons per hour. Then an attendant puts the pitted cherries into cans with a V-Type Dunkley filler. And another girl check-weighs every few cans for correct fill.

The tins pass under a nozzle, where 190 deg. F. boiled water is added up to the rim. Filled cans then move through a maze-type hot water exhaust box—held at 190 deg.—to produce a closing temperature of at least 160 deg. F. and to dissipate most of the air and carbon dioxide. Then, after exhausting, the containers pass through a topper that controls the headspace by tamping down the fruit and pushing out excess water.

Next is the vital sealing operation in which nitrogen is jetted into the cans just before closing. The cans are automatically coded as to date, type, grade, and plant after sealing, then are cooked in open 212 deg. F. water retorts. Five units are used for sterlizing, while six similar vessels are employed to cool the cans to under 100 deg.

---

chine operates exactly like conventional models, with protective devices making the gas addition almost foolproof. Placing new cylinders in the manifold is easy for the mechanics.

The only specialized training involves periodic testing of sealed cans for gassing efficiency. It is desirable to have a laboratory control man analyze, at intervals, the headspace gas directly after closure, and then recommend any changes in machine operation or fill deemed necessary.

A modified Orsat apparatus—similar to the instrument commonly used for analyzing flue gases—is used for rapid determination of the headspace gas. Field technicians from Canco and Linde very easily trained one of our men to perform this test.

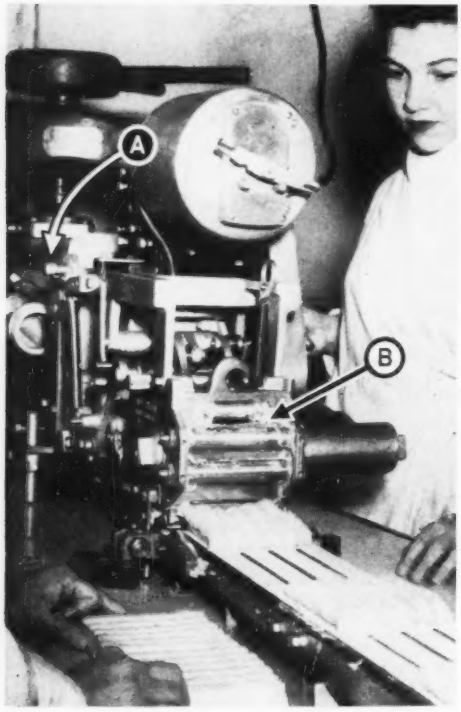
Briefly, the Orsat unit consists of a measuring burette, a leveling bottle, a water manometer, and two absorption pipettes. The leveling bottle is used to draw gas—received by puncturing the test can with a sampling device—into the measuring burette. Here, gas volume is adjusted to atmospheric pressure and forced successively into the two absorption pipettes by manipulation of the mercury-filled leveling bottle.

The first absorption pipette contains concentrated caustic solution to remove carbon dioxide; the second has alkaline pyrogallol to absorb oxygen. The gas absorbed—as measured in the burette—provides a direct reading of the percentage of that gas in the sample.

During the past season, we made a fair estimate of the cost of commercial nitrogen purging. In one test period, 56,860 cans were gassed—with nitrogen flowing at 4 cfm. and the closer sealing 183 cans per minute. Under these conditions, 22,000 cu.ft. of nitrogen was consumed (about 100 cylinders of gas).

Nitrogen cost came to about 1½c. per case of 24 No. 2's. However, production at the time was only 57.7 percent of capacity, due to the erratic flow of cans. So it is estimated that almost 100,000 cans could be purged by an equal quantity of nitrogen under optimum conditions, giving a cost of less than 1c. per case.

Rental of the special closing machine is slightly higher than that for the conventional one. Our unit was supplied at approximately $200 extra for the season.



FROM stuffer (A), meat is forced by 75-psi. air into dispenser (B) that extrudes it onto waxed paper through six orifices. Knives cut sausages and paper to 5 in. lengths.

GROUPS of six sausages are conveyor-fed to girls for single-layer packing into window-style cartons. Girl in background packs 40 cartons into a shipping container.

Now—Skinless Sausages

At 4,800 an Hour

New high-speed extruder forms ground pork meat into lengths, six at a time, and then ejects them onto waxed paper. And machine is time-and-labor saver

FE STAFF

Until recently, meat packers have either been stuffing sausages into sheep casings and then machine-linking them, or bulk-packaging the meat in 1-lb. cartons.

Now, however, there has come a change: Some of this seasoned, ground pork meat is being extruded, six sausages at a time, without the need of a casing.

Making a notable success with the new method is Habbersett Bros., Media, Pa. Employed is a No-Skin Sausage Dispenser (developed by Dohm & Nelke, Inc., St. Louis) that produces 4,800 links (1-oz. each) per hour. Rated capacity of the unit is 8,000 links an hour. This machine can easily be adjusted to produce 11/16-in.-dia. sausages varying in length from 2½ in. (½ oz.) to 5 in. (1 oz.).

■ **In short, we now have the skinless sausage that has long intrigued meat packers.**

The Case Against Casings

Many packers have made a try for the skinless sausage, but success has been elusive. One company, while not making a skinless fresh sausage, has developed a method of producing a canned, skinless sausage. Used here is a conventional stuffing machine for extruding the sausage, which is then cut into lengths, deep-fat fried to case-harden the surface, and heat-processed in cans by the conventional retort method.

And at the recent American Meat Institute meeting in Chicago, Visking Corp. offered a method of preparing skinless sausage links in the smoked rather than the fresh form. The pork meat is stuffed into artificial casings, cured at 40 deg. F., smoked at 150

deg. F., cold-water showered, and then peeled.

Skinless link sausages have appealed to packers for two principle reasons: First, cost of sheep casings for 100 lb. of meat is $10-$13. And until now there has been no way of "skipping" these casings. They had to be used to retain the shape of the sausage.

Second, sausages stuffed into casings are tougher to bite into when they are fried. So packers have been looking for ways of preparing a skinless product similar to skinless frankfurters (actually meat stuffed into artificial casings that are stripped off after smoking of the product).

A Look at the Operation

At Habbersett's, the new equipment with its 6-ft. four-unit rubber-belt conveyor, has been installed lengthwise on top of the regular stuffing table. Extruding and packaging of the sausages are carried out in a 50-55 deg. F. room to simplify the problem of maintaining the meat at the proper temperature.

When ready to operate, a removable stainless steel, swing-type pipe coupling is hooked up to the machine and to either of the two cocks on a 300-lb. capacity stuffer. In this way, the sausage extruder can be used in either a right or left hand position.

Going into Habbersett's pork sausage meat are over 45 percent primal cuts (hams, shoulders, and butts). After this quality meat is tempered to 30 deg. F. (a prime requisite), it is loaded into the stuffer. Next, the air valve is turned on to force the meat, under about 75 psi., out of the stuffer.

An operator depresses starting levers to actuate the dispenser and the conveyor, and then opens the stuffing cock to permit the meat to flow from the stuffer, through the coupling, and into the cylinder of the extruding unit. Full control of the extruding operation is maintained by this cock, since the dispenser merely idles when the supply of meat is shut off.

With the dispenser now in operation, a reciprocating arm shoves the six horizontal pistons forward and forces the meat out of the cylinder into six parallel orifices to form the extruded sausages. Pressure of the meat from the stuffer drives the pistons back, refilling the cylinder for another stroke.

The reciprocating arm that moves the pistons forward also operates a horizontal slide mechanism, which feeds waxed paper from a roll forward and directly under the extruded sausages.

A cam-actuated, guillotine-type, valve-plate and knife moves up and down to cut the extruded sausages into lengths. This combination plate and knife is held against the extruding orifices by two horizontal rollers that turn against its front face. A pair of cam-actuated knives, attached to the horizontal slide mechanism, cuts the paper.

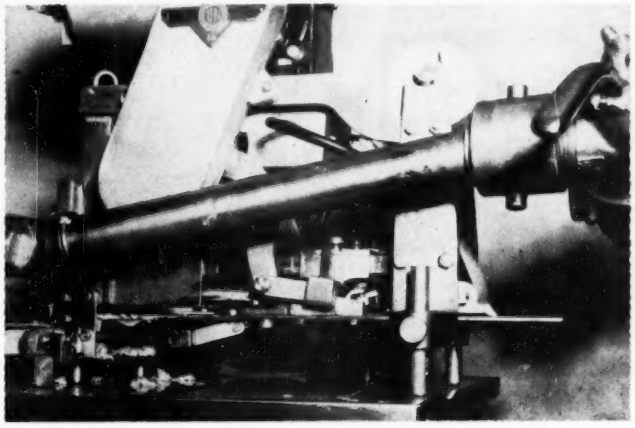
Purpose of the Paper

The paper is employed to facilitate handling of the sausages during packaging. Moreover, the sheets of paper serve as separators for double-layer packs. Later, the paper aids the housewife in removing sausages from the package for placing in a frying pan.

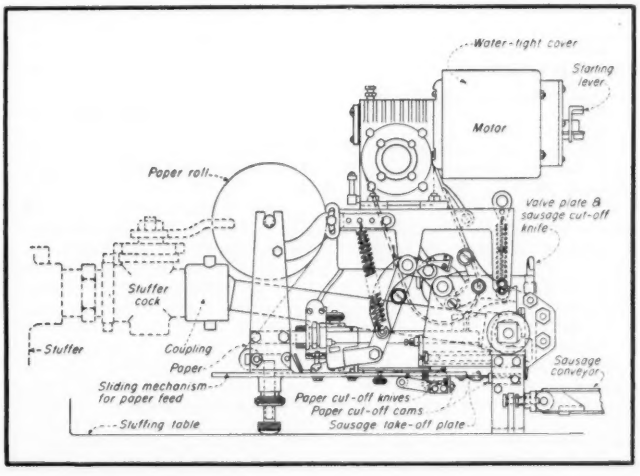
Forming sausages in this manner has eliminated the need for sheep casings and automatic linking machines. Also, considerable handling labor is saved by this straight-through system. Then, too, valuable cooler space is not taken up by rack loads of pork sausage being tempered at about 30 deg. F. for subsequent packaging.

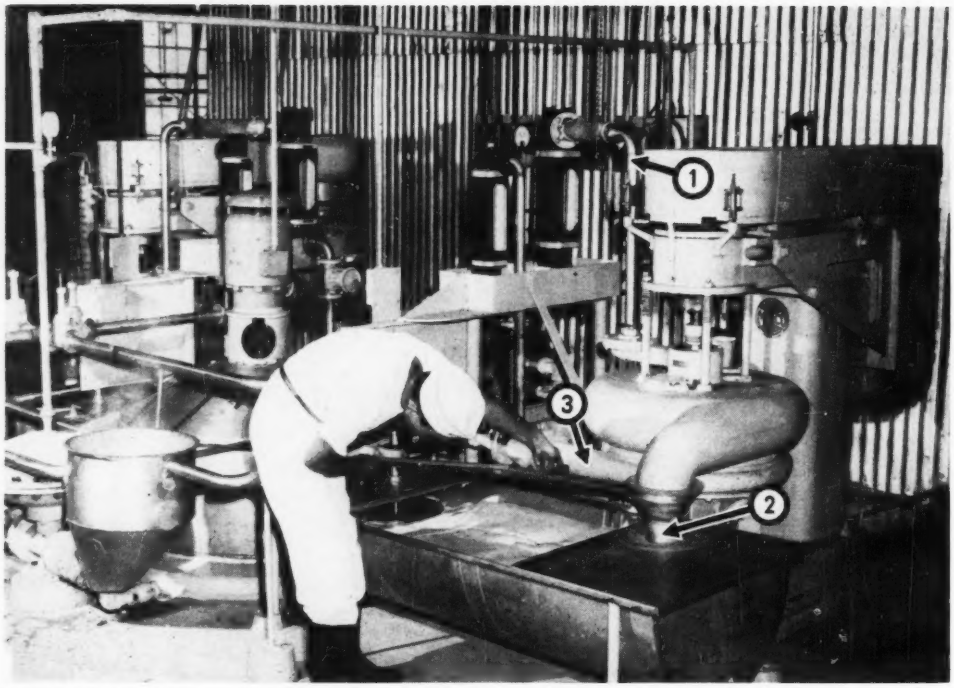
After the pork meat is extruded, the 6-ft. conveyor belt attached to the front of the dispenser takes each group of six sausages away from the machine. Three girls then single-layer pack them into 12-oz. window-type cartons. Finally, 40 cartons are grouped to make a shipping case of the product.

Extruder and Its Inside Workings



CLOSEUP of extruder shows coupling hooked up to stuffer, pistons, reciprocating arm, and paper dispensing mechanism.





FLOW of clarified juice from centrifuge is being observed by operator, who is seen lifting tank lid. These two centrifuges handle material on continuous basis, and flow lines are identical in each. At (1) juice comes in, and at (2) finished juice is collected. Solids go out at (3).

CENTRIFUGING BETTER JUICES

Unwanted solids more effectively removed, uniformity improved, when Hawaiian processor puts continuous high-speed rotators in pineapple-product line

E. S. SHEFFIELD, JR.

Factory Superintendent, Maui Pineapple Co., Kahului, Maui, T. H.

Progressive process mechanization scored another success when Maui Pineapple Co., Ltd., of Kahului, Maui, T. H., achieved production of a more uniform, higher-quality pineapple juice by installing continuous-type centrifuges.

This move notably exemplifies the beneficial role that food engineers play in the machine-modernization of food processing lines.

As in other plants, labor saving loomed as an important consideration. However, the primary attention centered on the factors of the method itself. A continuous method had to be devised incorporating these features:

- **Positive, accurate control of juice solids**
- **Classification and selection of the fine, even-textured solids, and**
- **Separation from the juice of fruit-eye ends and other undesirable materials.**

In the previous process, all juice pulp from the various pineapple machines was first put through a disintegrator. It was then heated and the first juice obtained by pulpers (drum-type extractors). The juice was then pumped to paddle-finishers. The pulp from the extractors moved to screw presses. And the resulting juice also was pumped to the paddle-finishers, remaining pulp going to the feed department.

The paddles in these units, which are still used in the improved process, are radially adjustable. By reducing paddle clearance, more solids can be forced through the screen. But as clearance is critically reduced there is always the possibility that a heavy load of pulp will break through the screen, and large amounts of pulp and fruit-eye ends would be introduced into the finished juice.

The amount of solids in the juice produced in these finishers can be controlled by varying the following four factors.

1. Amount of flow to each machine. Greater flow increases final solid content.

2. Speed of paddle agitator. Increased velocity pushes more solids through screen with the juice.

3. Clearance between paddles and screens.

4. Pulp discharge opening. Choking off pulp-discharge reduces escape of pulp from unit, consequently more pulp passes through with juice.

Each of these four adjusting procedures is somewhat dependent on the other. Formerly, an alert operator was required to keep the juice within the close solid-content tolerances. Juice from these finishers was pumped to holding tanks supplying the can fillers.

The improved process, deve'oped by Maui, uitlizes all of the old line equipment but does not rely on the paddle-finishers for the critical control of juice solids. Instead, these units now are so adjusted that they require a minimum of attention, and the centrifuge provides positive solids control, bringing better juice quality.

Use Modified Tomato Pulpers

The pulp (composed of pineapple cores and fruit meat, the latter taken from the skins and fruit ends), is ground in the disintegrator, then pumped through a pulp heater, and next goes to two modified tomato pulpers. The first juice extraction is via these pulpers, and the juice flows to holding tanks. Pulp is conveyed to six screw-type presses, where the second juice extraction occurs.

Juice from this second pressing is combined with the juice from the pulpers. The pulp continues through still another press for a final juice extraction. Juice from this final press is used for making syrup. The pulp, conveyed to another building, is added to the ground-up skins, and these solids are then dried in rotary furnaces for use as cattle feed.

Combined juice from the first two extractions contains 35 to 50 percent by volume of suspended solids. This is pumped into head tanks above paddle finishers, through which it flows by gravity. Today, however, with continuous centrifuges in the system, the paddle finishers' extraction of solids has been lessened. They now reduce the solids content to about 24 percent.

Thus, with a steady head on the inflowing juice, the finishers quite often can be operated for an entire shift with only minor adjustments being made by the operator.

To prevent any oversize material getting into the centrifuges, this juice is pumped at 25 psi. through a rotary strainer. This unit, of stainless steel, consists of a stationary cylindrical screen with slow-speed revolving scrapers inside. The resulting thickened fraction from the scrapers is discharged out the bottom and recirculated to the pulpers. Strained juice is then pumped to two Merco X-160 Centrifuges.

These continuously remove the dark fruit-eye ends, along with 3 to 6 percent of the heavier solids. Clean finished beverage juice, discharged in the overflow, contains solids ranging from 18 to 21 percent—the desired solids content for high quality juice. The juice is then pasteurized, canned, cooled, and labeled.

The amount of feed to the centrifuges varies with cannery production, and input into each machine frequently reaches 75 gpm. top feed, plus 15 gpm. return feed. The thickened underflow discharge is re-introduced into the system ahead of the pulpers.

This underflow, which contains the heavier solids and fruit-eye ends, is concentrated by the high gravity effect of the centrifuges. Pumped to the pulpers, it has an affinity for the hot sticky pulp, and the combined material moves to the presses. The juice contained in the underflow is therefore not lost.

The fruit-eye ends and heavy pulp show only a very slight build-up due to recirculation. This reaches an equilibrium and does not effect the centrifugal separation efficiency or overall results.

Cake is discharged only from the final press. And this allows for close moisture control at this one point, assuring a maximum juice yield.

Board Tells the Story

Quality control samples are taken of the finished juice and finisher output at 15-min. intervals. The solid content and fruit-eye count is posted on a blackboard in view of the juice-extraction operator. This operator has only three valves to manipulate on the centrifuges to keep his output of quality juice within the prescribed limits.

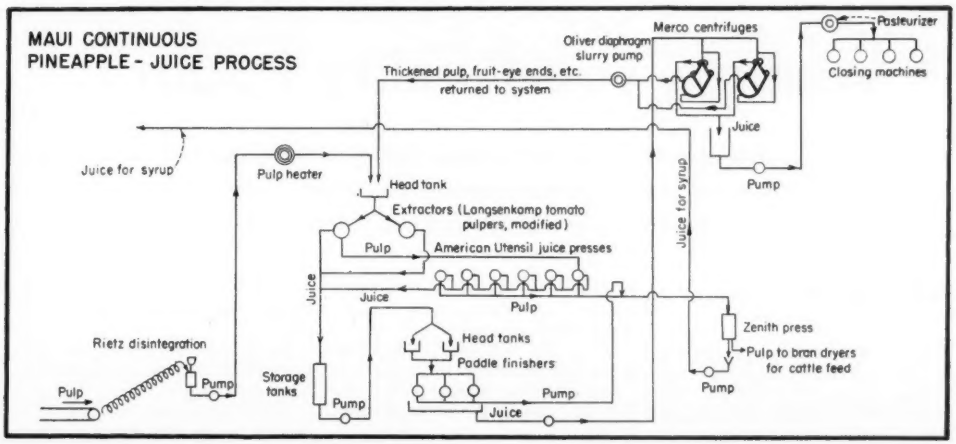
Feed is supplied to both top and bottom of the centrifuges under 25 psi. pressure from the rotary screen. The fruit-eye ends and heavy solids entering the separating chambers are forced out to the periphery through nozzles (fixed orifices) to the underflow. Clean juice and very fine solids flow upward at the rate of 75 gpm. through the disks and out the overflow.

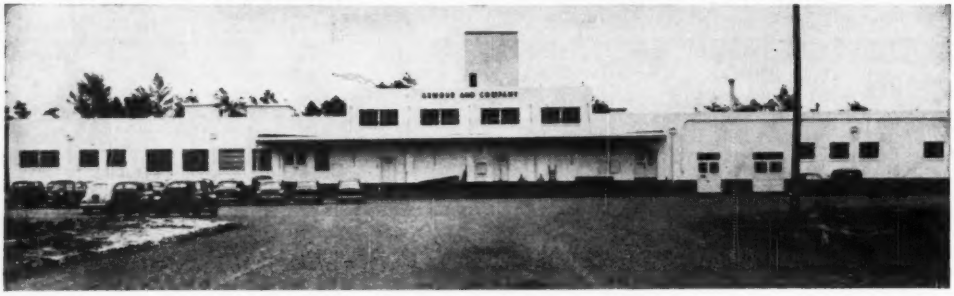
The thickened underflow, usually about 5 gpm., is controlled by cracking the underflow valve. The recirculation of material at the periphery of the bowl prevents solids build-up and keeps nozzles free from plugging.

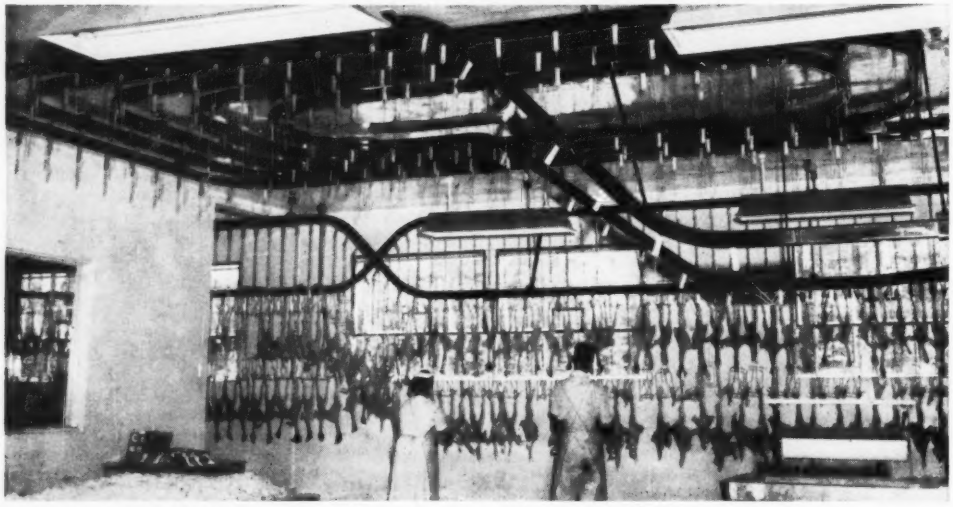
By returning part of the thickened underflow to the system, the centrifuge is, in effect, operating as a classifier—producing in the overflow a selected type of solids. In the finished

(*Turn to page* 187)

How Centrifugals Were Applied







PLANT AND OPERATION. Top: Building is modern. Processing is on ground floor, box make-up on second, ice making in tower. Above: Ceiling merry-go-round conveyor on which eviscerated poultry is drained and dried for cutting (drain pan not shown). Length and speed of unit assure optimum drying performance.

Egg-to-Market Control

Assures Top-Quality Poultry

What's more, the product is turned out at reduced costs by close-focussed Armour operation . . . Start-to-finish supervision effected through practical joint-ownership

IVAN C. MILLER
Assistant Editor, "Food Engineering"

By adopting a coordinated program for control of (1) egg production and hatching, (2) poultry feeding and growing, and (3) poultry picking and dressing, Armour and Company, at its Salisbury, Md., plant has markedly advanced the whole operation of processing dressed poultry.

It has thus been able to eliminate costly feeding stations at the plant.

Time between growing house and slaughter has been cut to 30 min. or less.

Control of weight and size of the dressed fowl has been made fairly precise.

The system has enabled the company to discontinue intermediate refrigerated storage.

And all this has resulted in a much-improved quality of meat,

throughout all seasons of the year and at reduced production costs.

This project, the joint venture of Armour and Company, Hastings Hatchery, and Ches-Peake Quality Farms, is termed the first time in which large scale poultry operations are controlled from procurement of eggs to marketing of the dressed chickens. Let us follow each step and note its important role in the overall program:

Hatching, Feeding, and Growing

Eggs from flocks specially selected for meat-producing characteristics are purchased at premium prices of between 20 and 50c. above market average. They are trucked from controlled egg producers in New Hampshire and Connecticut to the Maryland hatchery to meet the incubating schedules, which start twice a week.

Similarly, 21-day incubation periods end twice each week, and approximately 40,000 one-day-old chicks are then trucked the few miles from the hatchery to the growing houses adjacent to the poultry dressing plant. Here, in one of the 600 by 48 ft. brooding and growing houses—there are 17 such houses—chicks are nursed for 11 to 12 weeks to broiler size (dressing out at just under 2 lb.) or to fryers (with between 2 and 3 lb. eviscerated weight).

Feeding and growing conditions are maintained as near as possible to optimum. Diet is changed four times before the birds mature, and during this period scientific disease-preventing methods are applied.

Winter and summer, the brooding and growing houses are temperature controlled. To the baby chicks is piped a 90-92 deg. F. atmosphere. Then as feathers are developed, heat is lowered to a final temperature of 55 deg. F. for mature birds. In each house, thermostatically regulated warm air is delivered to the hover enclosures regularly spaced throughout the length. Exception is during the excessive heat of summer, when houses are cooled by passing air over ice.

Steam for heat is generated in each building by stoker-fed boilers and piped to coils through which fan-driven air passes to the distributing ducts. There is no chance of any chick-fatal drop in temperature in the houses due to failure of the current driving the stoker motor—for 10 kv. stand-by auxiliary generators are installed to cut in.

Control of egg production, hatching, and growing has at least five advantages:

1. An above-average percentage of eggs are hatched.

2. Weight and size of the poultry is controlled.

3. Chicken mortality is reduced by 10-12 percent.

4. Minimum feed is required to produce meaty birds.

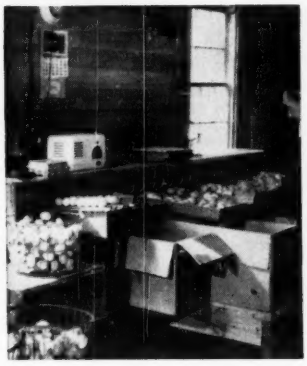
5. Resulting poultry is of higher quality than average, hence commands higher market prices.

Poultry is withdrawn from the growing houses only as required to meet processing line needs. The inter-

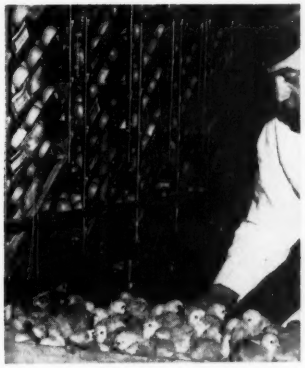
A Full-Process Display

—graphically detailing the many engineering improvements, will be found in this month's FE Picture-Flowsheet. Titled "Modern Poultry Dressing," it includes a big array of key-point photos. See pages 122-125.

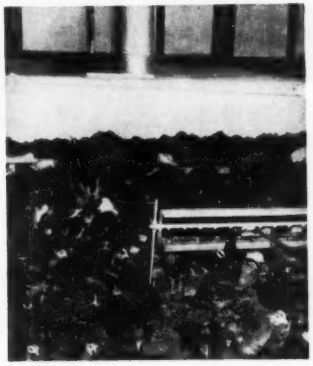
3-Step Chicken-Raising Control: Egg Production, Chick Hatching, Growing



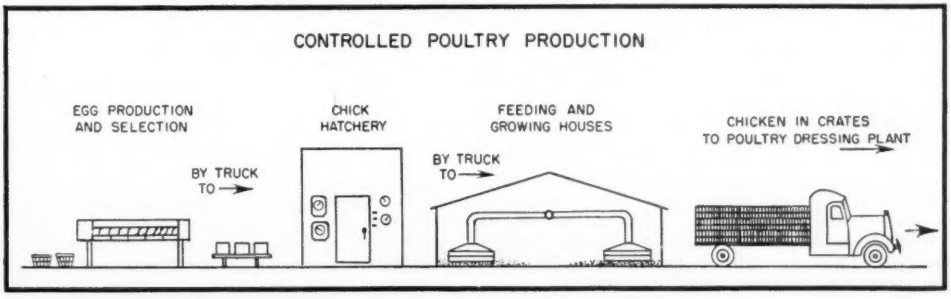
TO produce meaty birds, eggs are selected from controlled farms.



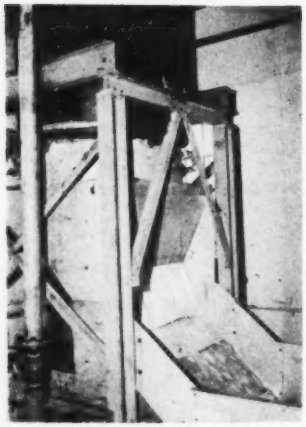
IN heat-and-humidity controlled chick hatchery, eggs turn mechanically (left).



CHICKS—80,000 a week—are fed, nursed, and raised scientifically.



Ice made in tower . . .



AUTOMATIC machine makes ice "by the clock"—24 tons a day.

. . . Cools the birds

FROM bunker, ice streams into mobile tubs to chill poultry before packing.

val for cooping the birds, trucking to the plant, and a slaughter is seldom even as long as 30 min. Hence, there are no delays in "handlings" which might affect the quality of the poultry.

Mass-Production Dressing

From the time each bird is suspended by the legs from a single contninously moving, closed type of overhead roller-bearing conveyor, the travel through all processing operations is uninterrupted and at a fixed speed delivering 2,000 dressed chickens per hour at the end of the line. The velocity of the whole line can be changed, however, when advisable for speed-up or slow-down, by regulating a variable speed control.

Defeathering is done in a series of machine operations, most of them automatic. And the older method of tank scalding has been replaced by a continuous method of spraying the birds with scald water at 124 deg. F. Difficult-to-remove feathers on legs and necks are further scalded, in travel, by dipping into temperature controlled baths held at 160 deg. F.

Primary plucking is done as birds travel between rotating rubber flails. Stiff wing feathers, and other feathers not removed by the flails, are machine plucked as operators hold the feathered portions of the birds against the rubber cylinders of the machines.

Pin feathers are extracted manually just before the conveyor carries the birds through a singe-ing gas flame. The only washing or cooling the fowl receive before evisceration follows immediately after singe-ing. The washing unit is automatic. In it, the birds are cleaned by whirling rubber flail-like strips and simultaneously washed by a cold water spray.

As the fowl leave the washer they are "New York Dressed". A small portion of the pack, to be marketed as such, is transferred at this point to a branch line conveyor. After inspection and icing in mobile trucks, the dressed fowl are packed in wood cases, then again iced for shipping.

"Hot Evisceration"

Most of the pack—all but the few birds sidetracked to satisfy the diminishing demand for "New York Dressed" poultry—now travels to the eviscerating department where, at body temperature, entrails and giblets are removed from the fowl.

As was pointed out previously, the poultry is scalded, soon after slaughter, to loosen feathers. Heat is thereby added to the body temperature. The only cooling before evisceration—other than that resulting in the few minutes at air temperature—is administered as the plucked birds pass through the washer-cleaner. Time of exposure here to the cold spray is of short duration, temperature loss is slight, and at the surface. The purpose of spraying is to clean rather than to cool.

Evisceration prior to effective cooling, and before the poultry has lost body heat, is practical if the time between slaughter and removing the entrails and giblets is short enough. And this "hot eviscerating method has these four decided advantages:

1. Cost of constructing an insulated intermediate cold storage room is avoided.

2. Refrigeration equipment costs and operating expenses are reduced.

3. Processing time is shortened, with consequent increase in production rate.

4. Quality of dressed poultry is improved.

Following Federal Inspection, giblets removed during evisceration go to the giblet-cleaning station, where they are separated—hearts, livers, gizzards—then cleaned and washed. Gizzard lining is removed from the meat by a mechanical stripper before final washing.

Cleaned and separated giblets are now filled into stainless steel containers and immediately refrigerated to 38 deg. F. in small specially designed giblet coolers. When the temperature is sufficiently reduced, giblets are assembled and assortments packaged in parchment bags, which are machine-closed with staples. Packaged giblets are then transported to the poultry packing station, where a package of giblets is placed in the body cavity of each bird.

Now to return to the eviscerated bird and follow it from Government inspection to the packing station:

The inside of the fowl is cleaned by first washing with a stream of water from a hose-nozzle inserted into the body cavity. Lungs and membranous tissue are then removed when a suction tube on the end of a vacuum line hose is inserted inside the bird. Waste material thus removed goes to a collecting tank, which is emptied when production is interrupted (as at meal time or the end of a shift).

A final inspection by plant personnel completes processing, except for icing, labeling a wing of each bird with a tied-on tag, and packing as whole eviscerated poultry.

Economical Icing

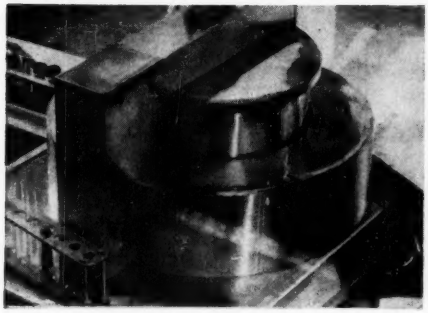
To remove body heat and provide pre-packing cooling, dressed poultry is iced in mobile, galvanized tubs. A single ice-making machine, with capacity of a ton of ice per hour, is ample for all plant needs, including the occasional cooling of growing houses on very hot summer days.

Time cycle instrumentation controls the ice maker's operation. After a charge of ice is emptied from the machine, the new time controlled cycle starts when refrigerant is admitted to a series of vertical tubes inside the machine's insulated shell. Water is then pumped from a float valve-controlled reservoir and sprayed onto the tubes, where it forms into ice.

The end of the water spraying cycle is followed by a short period to permit all unfrozen water to drain. Then the cold liquid refrigerant is automatically pumped from the tubes and replaced by hot gas from the compressor. This causes the ice to melt at the surface of the tubes and slide down them. Then a mechanical breaker reduces the hollow tubes of ice to "cracked ice", which is

(*Turn to page* 141)

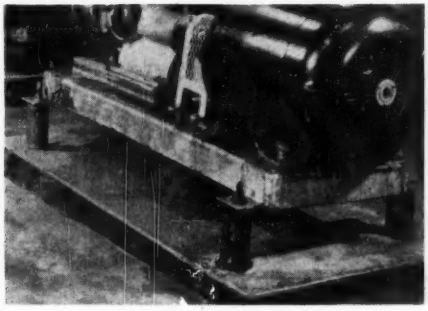
A SPECIAL FOOD ENGINEERING REPORT



Resists Contamination

Readily Apart

Rounded Corners



Raised Off Floor

How to Assure Top Sanitation In Your Processing Equipment

Insist on the non-corrosives, shun seams, emphasize easy dismantling, and install to bar debris . . . is the terse "working theme" advised by this practical report on the needs, materials, placement, maintenance — and precautions — that are primary in obtaining food-line cleanliness

Editor's Note — Presented here is a highly significant section of the forthcoming book, "Sanitation For the Food-Preservation Industries," prepared by the Association of Food Industry Sanitarians in cooperation with the National Canners Association. The volume is scheduled for publication January 25 by the McGraw-Hill Book Co. as part of its special Food Technology Series.

DONALD L. TRUAX, STEPHEN M. ANDERSON, VINCENT W. BARNES, EDWIN S. DOYLE, and IRA I. SOMERS

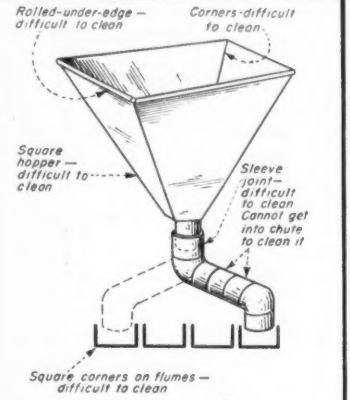
Chairman and members, respectively, of the Editorial Committee, Association of Food Industry Sanitarians

The blunt truth of the matter is that each food processing machine has peculiar sanitation problems all its own.

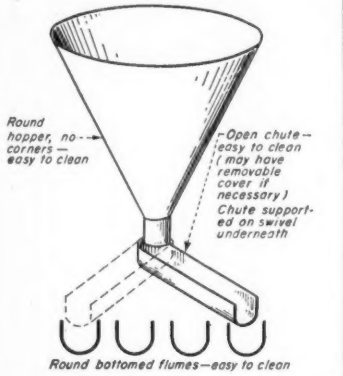
And frequently there is this further complication:

FROM BAD TO GOOD IN UNIT DESIGN

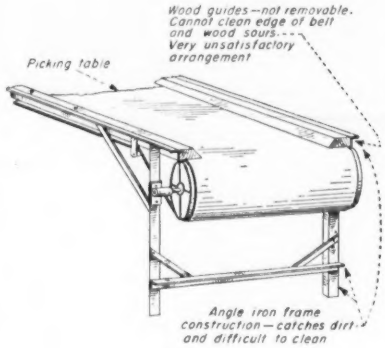
Bad...


Rolled-under-edge — difficult to clean
Corners-difficult to clean
Square hopper — difficult to clean
Sleeve joint — difficult to clean Cannot get into chute to clean it
Square corners on flumes — difficult to clean

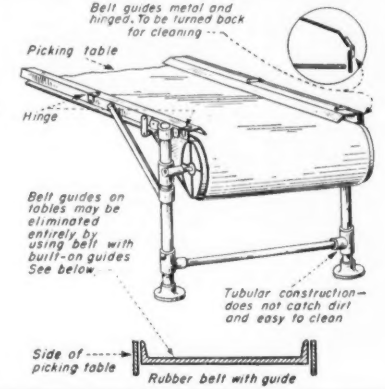
Good


Round hopper, no corners — easy to clean
Open chute — easy to clean (may have removable cover if necessary) Chute supported on swivel underneath
Round bottomed flumes—easy to clean

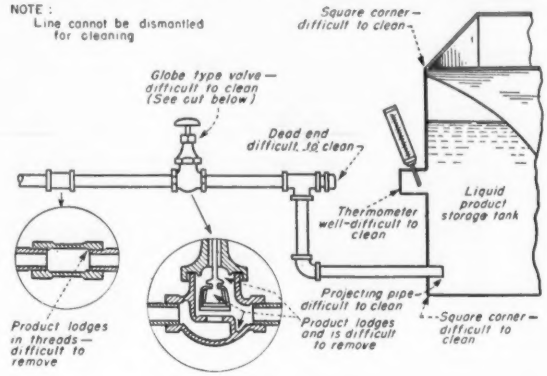
Bad...


Wood guides—not removable. Cannot clean edge of belt and wood sours. Very unsatisfactory arrangement
Picking table
Angle iron frame construction—catches dirt and difficult to clean

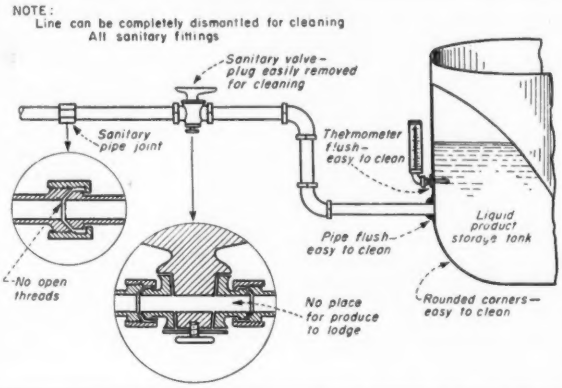
Good


Belt guides metal and hinged. To be turned back for cleaning
Picking table
Hinge
Belt guides on tables may be eliminated entirely by using belt with built-on guides See below
Tubular construction—does not catch dirt and easy to clean
Side of picking table
Rubber belt with guide

Bad...


NOTE: Line cannot be dismantled for cleaning
Square corner—difficult to clean
Globe type valve—difficult to clean (See cut below)
Dead end difficult to clean
Liquid product storage tank
Thermometer well—difficult to clean
Projecting pipe—difficult to clean
Square corner—difficult to clean
Product lodges in threads—difficult to remove
Product lodges and is difficult to remove

Good


NOTE: Line can be completely dismantled for cleaning All sanitary fittings
Sanitary valve—plug easily removed for cleaning
Sanitary pipe joint
Thermometer flush—easy to clean
Liquid product storage tank
Pipe flush—easy to clean
No open threads
No place for produce to lodge
Rounded corners—easy to clean

Pieces of equipment may function process-wise to the greatest satisfaction—yet be extremely difficult to clean.

In fact, plant engineers are often baffled when they try to visualize ways to revamp such units so they will meet sanitary requirements and at the same time still retain their original process efficiency.

In the past, manufacturers have given more attention to the functioning and cost of machinery than to its sanitary features. Fortunately, however, the present trend is toward better sanitary design. Such optimum design requires that the equipment be constructed of materials that are easy to clean, and that all surfaces be readily accessible for cleaning. Poor construction of equipment invites contamination of food by such objectionable substances as wood splinters, chipping paint, and metal fragments, as well as decaying food particles.

And even well-designed equipment may be insanitary if not properly installed. The framework or supporting posts should be kept to a minimum, and sufficient space should be left around each machine to permit cleanup men to reach all dirty surfaces readily.

When a machine has a solid base, it should be mounted on a solid foundation and sealed so that water, juices, insects, rodents, and spilled food cannot get under it, or it should be mounted sufficiently high above the floor to permit proper cleaning underneath.

The "Why" of Insanitary Machines

When purchasing equipment, many companies fail to take into consideration all the economic factors involved. They mistakenly base their purchases on initial costs only—forgetting that there is often very little relationship between first costs and cost per unit of product handled, and neglecting to take into consideration the potential expenses of upkeep and cleaning.

Definitely, cost per unit produced should be determined, based on factors of operation, depreciation, maintenance, and cleanup. Then it may be shown that equipment which is more expensive to purchase, but is easier to clean and is more durable, is cheapest in the long run.

Frequently, there are encountered unusual arrangements of equipment, or unique operating technics, that require special machinery—and frequently such special units either are not on the market or are considered too expensive to justify their purchase.

Common answer to this dilemma is to have the needed units built by plant mechanics who, rarely being versed in the fine points of sanitation, generally come up with equipment posing cleaning chores anywhere from "difficult" to "nearly impossible."

General Considerations In Equipment Construction

In building equipment, steel tubing has several advantages over angle or channel iron—

1. *Greater strength*—permitting lighter construction with fewer points touching the floor.

2. *No flat surfaces* to catch and hold food particles or other debris.

3. *It sheds water and juices readily*, thus minimizing corrosion and lengthening the life of the paint.

4. *It is easier to clean.*

Supporting brackets should be welded to the posts, and all tubes should be capped. Drilling should be avoided (except at the bottom to drain out condensate), because holes decrease the strength and open up the pipes for entrance of water and juices. And to improve paint adherence, a phosphoric acid wash is advised before painting the pipe.

Junctions—as between two pipes, a pipe and a tank, two pieces of metal, or any two surfaces—must be smooth and flush, with no seams or cracks that might hold food or harbor bacteria. Sleeve joints must be avoided. Joints should be butt-welded and ground smooth, rather than be of the lap or offset type.

Dead ends consisting of sealed-off pipes or pockets, into which the product may flow and be temporarily or permanently held, are often foci of bacterial contamination. Examples are thermometer wells, drains, or unused pipe extensions which have been capped.

Pumps, finishers, or other equipment with enclosed surfaces which contact food, or from which juices drain into the food, should be constructed in such a manner that they can be easily opened up for cleaning.

All flumes, screw conveyors, fillers, product-holding or cooking tanks, should have coved or rounded corners with smooth finishes. Slime tends to build up in square corners and is hard to remove; whereas coved surfaces can be cleaned easily. Corners coved on a radius of less than 1 in. are very hard to clean.

Food particles may become lodged in rolled-under edges and be difficult to remove.

All equipment in which products are conveyed, held, or prepared should be covered to prevent contamination of the food by condensate, dust, or dirt. These covers must be removable so that the equipment can be easily cleaned.

Placement of Motors, Bearings, Drip Pans

All motors and oiled bearings on food-handling equipment should be located where there is no possibility for oil or grease to drop into the products. Shaft bearings must have an oil seal and a constant oil feed when used in equipment holding food, because if the bearing is not kept full, water and product may work into it and become a source of contamination.

Motor mounts should be raised sufficiently high to permit cleaning beneath them, and the motors should be splashproof.

Drip pans should be placed under all motors or bearings from which there is a likelihood of oil or grease dripping into the food. These pans should be large enough to hold all the drippings for the operating period, and they should be emptied periodically. They should not be filled with water during the cleanup.

Precautions In Handling Steam

Use of live steam to heat products in kettles is an objectionable practice. When there is no alternative, however, a check valve opening to the atmosphere should be installed in the feed line. This will prevent the product from being sucked back into the line when the steam is turned off.

A trap and strainer should be put in the line to catch condensate and prevent rust flakes from entering the product. And special attention should be given to the operation of the boiler to prevent compound from being carried with the steam.

Where steam or fumes discharge from equipment, adequate hoods are advised for conducting these gases outside the building. These hoods must be equipped with a catch-basin at the lower edge of the flange to prevent the condensate from running back into the product.

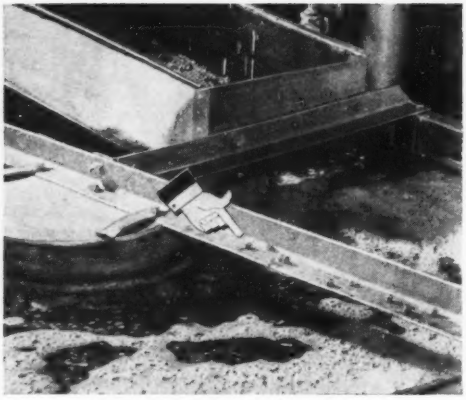
Valves and Lines

In food conveying lines, the valves must be of a sanitary type that can be easily dismantled for cleaning. When pressure is used, the plug-cock type of sanitary valves may leak. In such cases units with rubber diaphragms for closing may be advisable, since these valves have no pockets or areas in which the product might lodge.

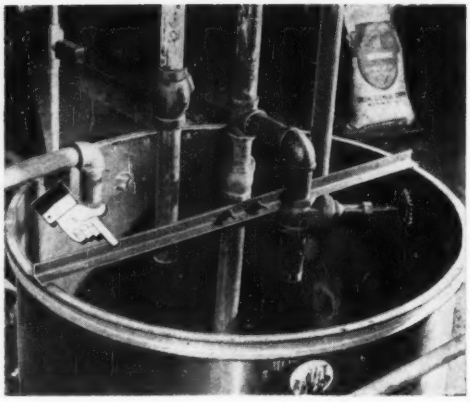
A sanitary line is specified as follows:

All pipes, fittings, valves, and pumps are to be made of non-corrodible material and permit ready dismantling for cleaning or inspection. All finishes and joints shall be smooth and flush-fitting, with no cracks or crevices into

INSANITARY



Product-messed strips



Open kettle invites contaminants

which food might penetrate. All threads are to be on the outside of pipes and fittings.

There shall be no dead ends, sleeve connections, bent or dented pipe, or sharp corners which cannot be cleaned. And no sags that will retain product or cleaning fluids.

Materials of Construction

For sanitary purposes, materials from which a machine is made must be resistant to attack by food, or by detergents and germicidal agents used in cleaning. Following is a discussion of the various materials commonly used in food plant equipment:

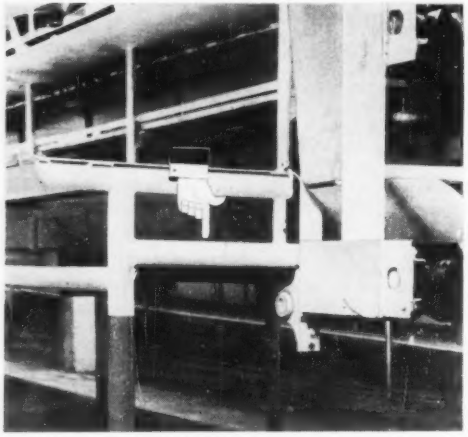
Wood is unsatisfactory as a construction material for food-handling machinery. Because it is porous and cracks with age, juices readily penetrate its surface, become sour, and create objectionable odors and foci of product contamination.

Moreover, it is difficult to clean. After it has been used a short while, it begins to splinter. And the splinters may contaminate the finished product.

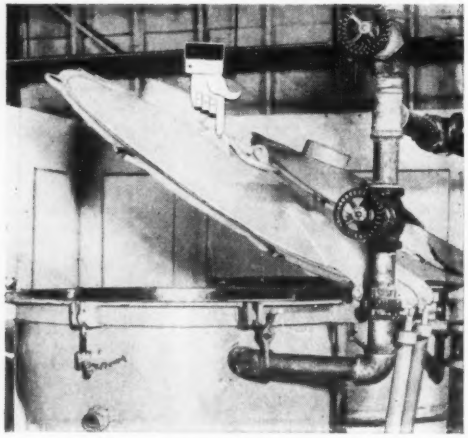
Holds of wooden fish-carrying vessels must be watertight, with no unsealed cracks to retain debris and permit blood and slime to enter the bilges. On vessels where the engine room is forward of the hold, the stuffing box on the shaft and the shaft alley must prevent any seepage into the bilges. "Limber" holes of generous size in all ribs aid in washing a vessel. To eliminate the use of a deck pump, the bilge pump must be connected to a sump in the fish hold to remove the water and detergent solution used for washing.

Black and Cast Iron may be used successfully in the construction of framework for machinery. However, they are less satisfactory than other metals for use in contact with foods, because they are susceptible to corrosion, which roughens the surfaces and makes them difficult to keep clean. Iron also causes discoloration in certain foods.

. . . ARE SIMPLY

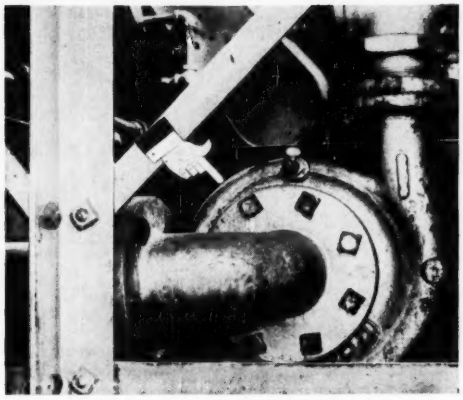


—Tubular members

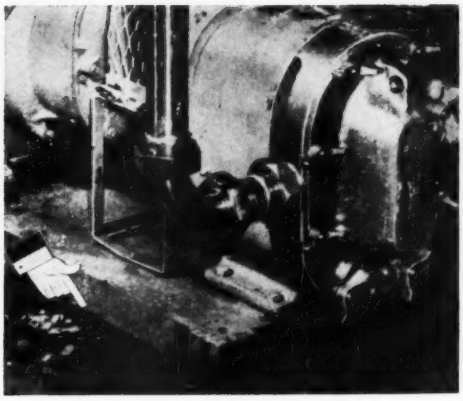


—Protective covers

CONDITIONS . . .



Units hard to take down



Base that harbors dirt

Steel has many uses in the construction of food-handling machinery where strength and hardness are required. However, it rusts readily under the moist and acid conditions frequently encountered in food plants. And like iron, it may lead to product discoloration.

Galvanized Iron, while acceptable for certain purposes, should not be used where friction occurs, because the zinc wears off and corrosion results. Neither should it be used in contact with fruits, for zinc is soluble in fruit acids. Nor is it suitable for equipment which is to convey or hold green vegetables, because sufficient zinc may be absorbed by the product to produce a dark-green discoloration.

This metal is not favorably regarded by many officials who enforce the food laws, due to its poisonous properties. Alkaline detergents should not be used on it, because they dissolve the zinc.

Stainless Steel is the preferred construction material for food-handling equipment. It is not corroded by most foods or cleaning materials, and it produces no discoloration. It remains bright and smooth with use, so that cleaning is easy. Stainless is, however, corroded by sodium chloride, hence should not be used with salt brines.

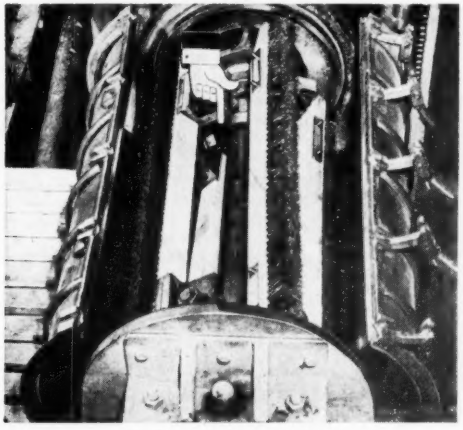
There are many types of stainless. The correct one should be selected according to the conditions of use.

Monel Metal is a copper-nickel alloy that has considerable resistance to corrosion. However, for corn, lima beans, or peas, where a small amount of copper may produce darkening of the product, Monel should be avoided. However, it is preferred to most stainless steels for conveying salt brines.

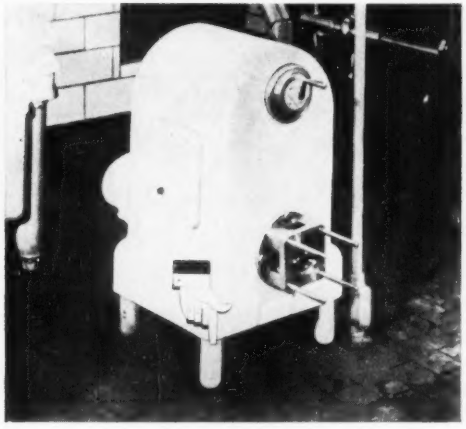
Brass, Copper, and Bronze are fairly resistant to corrosion. But when they are used in contact with certain foods, particularly corn, peas, and lima beans, or for conveying brine in which these foods are canned, discoloration of the finished product may result.

Copper or brass containers for holding food must be tin-

AVERTED BY



—Accessible parts



—Proper installation

coated to make them safe for use. This coating is removed by wear and by alkaline detergents, exposing the copper underneath, and so it should be renewed when necessary.

Aluminum is not too satisfactory, because it is easily bent and readily corroded by alkalis and certain acids. Electrolysis is also a problem. However—*Aluminum Alloys* of the rigid and strong corrosion-resistant type may have a place in the construction of lightweight equipment.

Glass may be used either as a lining for vats and tanks, or as piping for conveying liquids. Heat-resistant glass tubing, when properly installed, is satisfactory as a conveying line. It is not readily corroded, and it is easy to clean and inspect. Glass tubing may be employed in place of Monel for conveying salt brines where copper is likely to produce discoloration.

Enameled Pans and Equipment are unsatisfactory for use in food plants because the enamel chips readily and may be left in the food. Also, cracks are formed into which bacteria many penetrate and produce foci of contamination.

Rubber is a satisfactory material for belting. And rubber hose may be used as pipe extensions on syrup lines or as joints for food-conveying lines. Sections of rubber hose in pipe lines should be easily demountable to permit thorough cleaning and inspection. However, after extensive use, rubber is often badly cracked or worn sufficiently to expose the fabric, which makes cleaning difficult. Replacements should be made before this occurs.

Fabrics and Fibers absorb juices and provide harborages for microorganisms, with the result that they frequently are sources of bad odors and product contamination. Bristles sometimes break off of brushes and may get in the food.

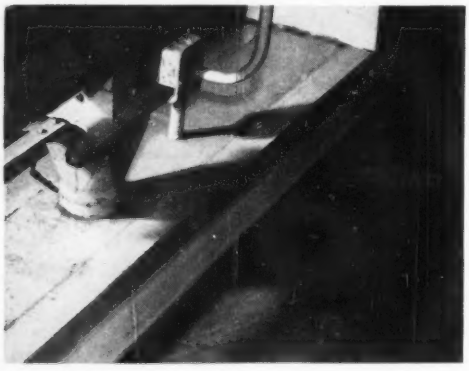
Cloth or Paper Ingredient Bags should not be used as shields, product guides, tank plugs, or syrup filters, because they are generally in bad condition after a few hours of use and may contaminate the product with bacteria, or with ink and preservatives. Stainless-steel or rubber guides without a fabric core are much more satisfactory as "slowdowns" and "shears".

Equipment Maintenance

All equipment should be properly repaired as soon as it becomes defective in any way. Makeshift repairs are to be shunned, since they often lead to insanitation.

Surfaces should be kept free of slime for sanitary reasons, and because corrosion proceeds rapidly under slime deposits.

Where possible, surfaces should be painted at least once a year, with all old paint or scale removed before applying the new coating. Paint must not be used where there is danger of its flaking off into the product.



ALTERNATE METHOD for sanitary placement of a machine—when it is not feasible to mount the unit off the floor—is to fill its base with concrete.

Frequent inspections of equipment and checks upon its operating efficiency should reveal the need for repairs in time to avoid breakdowns.

Wooden Tanks Require Special Care

At the end of a season, wooden tanks should be washed to remove all organic material. In tanks without metal coils, water should be introduced to a depth of 10 to 12 in., and lime water added to prevent algae growth.

To prepare this solution, pour the quantity of lime to be used (5 lb. of unslaked lime for every 1,000 gal. of tank capacity) into a barrel. Next slowly add sufficient water (with continuous stirring) to dissolve and suspend the lime. Then add the suspension to the water in the tank. A hose can be extended to the bottom of the tank to aid diffusion of the unslaked lime as the tank is being filled to capacity.

As an alternative, the unslaked lime may be suspended from the top of the tank in a bag. The lime will diffuse slowly and maintain better control for a longer period.

When the water becomes brackish or tainted, it will be necessary to drain the tank, clean, refill, and again add unslaked lime.

If insects are likely to breed in the tanks and lime cannot be used, mineral oil (quantity dependent on the size of tank) may be poured on the top of the water and small amounts added at intervals to maintain a layer of oil over the entire surface. The oil will also prevent the formation of yeast, or algae accumulation. Prior to the next season, the oil can be floated off the top by overflowing the tank with water.

Tanks should be inspected to determine need for scraping to remove the soft, absorbent surface wood. Scraping should be done carefully, because a badly scraped tank will continue to feather and peel during operations. To prevent wood shavings from being conveyed through the lines after scraping, the line at the base of the tank should be disconnected and the tank carefully rinsed.

Tanks can be thoroughly scrubbed with a 200-ppm. chlorine solution. Rinse thoroughly with cold water. An alternative method of scrubbing calls for use of 100-grain distilled vinegar. Protective goggles and gloves should be worn. Rinse thoroughly with cold water.

Painting Buildings and Equipment

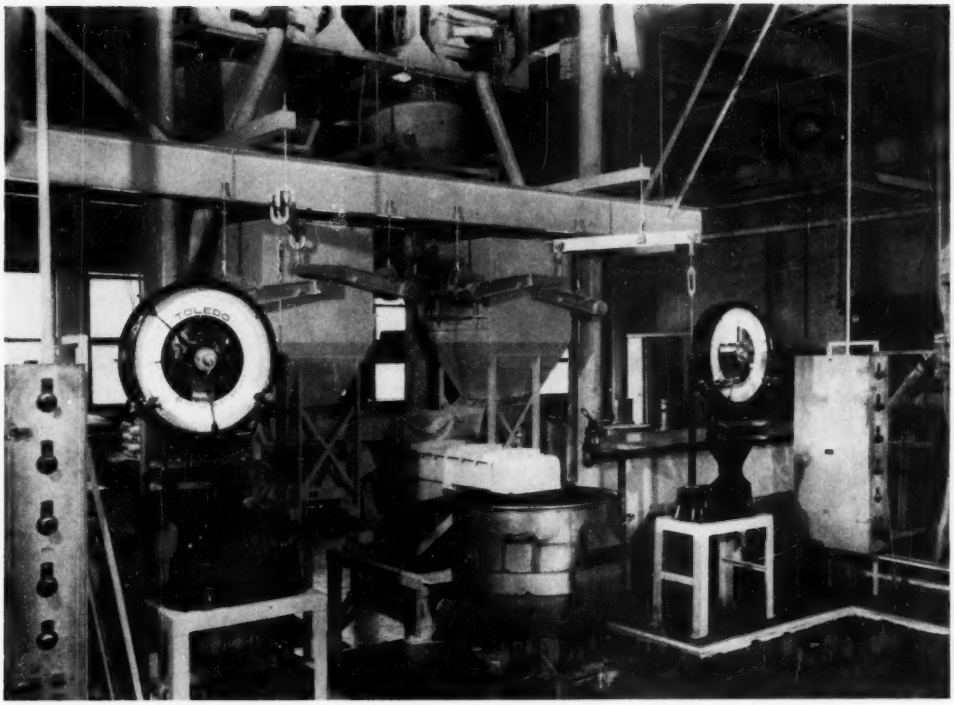
To be satisfactory for use in contact with foods, paint must be free from toxic or flavor-producing substances. Phenols and heavy metals should be avoided.

Paints should tolerate humid conditions without peeling or mildewing. They should have good adhesive properties on wood, metals, and masonry, and be resistant to cleaning procedures, germicides, and food products.

Pipe lines and electrical conduits may be painted distinctive colors to identify them at different points in the plant. In additions, the American Standards Assn. recommends identification of lines with letters stenciled on the pipe.

Colors used for painting walls and machinery partly determine the rate of employee fatigue. Light colors show up dirt and thus encourage good housekeeping. Bright colors may be employed to emphasize important points; grays to subordinate unimportant areas.

Many paints are available for which special germicidal properties are claimed. These generally have as their active ingredients organic derivatives of mercury or copper, or a phenolic compound. Used as surfacings, such paints will not prevent mold growth in food products deposited on them. These paints should not be used where contamination of food might occur.



HERE, in Grennan's bakery are seen the two Toledo Scale photo-electric batch control units that automatically and accurately weigh flour and sugar for each batch of batter. Ingredients are conveyed from storage to sifters, then go to scale hoppers, and finally into the vertical mixing bowl (center).

"EYE"-SCALES: For Batch Accuracy

Ingredients are weighed with "robot" precision by Chicago bakery's automatic photo-electric proportioners. Result: Cakes better, high quality constant

FE STAFF

Ingredient-scaling accuracy is now a prime requisite for consistently producing top-quality foods. Too often, quality suffers through human errors in batch-weighing.

To avoid inaccuracies in the weighing of flour and sugar, its two major ingredients, Grennan Bakeries has installed two Toledo Scale Co. photo-electric batch control units in the Chicago plant.

Here's how this automatic system eliminates error in the batching operation.

From floor-level metal storage bins holding approximately 2,500 lb., flour and sugar are individually moved by horizontal and vertical worm-screw conveyors to automatic vibrating sifters. Next, the sifted ingredients drop into cone-shaped hoppers. From here, vibrating chutes feed them into 240-lb. capacity suspended hopper scales with photo-electric attachments.

Two photo-electric tubes on each scale provide two-fold precision—weighing material in and out of a scale hopper. Thus, this system eliminates the possibility of error caused by the accumulation of granular materials in the scale hoppers.

The "How" of It

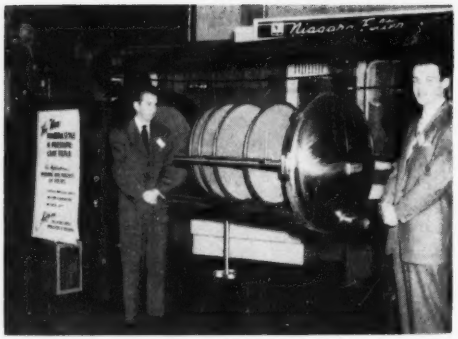
Weighing units consist of a scale with two half-dials, one for weighing material into the hopper and the other for weighing it out. Each half-scale has a photocell, indicator, and photocell-interceptor.

To run material into the hopper, a pushbutton is actuated, then a vibrating feeder discharges material into the hopper. As the weight increases in the hopper, the interceptor travels toward the photocell until it passes under it and cuts off the light. This changes the vibrator conveyor to dribble feed. Then, as the interceptor passes from under the photocell, the vibrating conveyor is stopped at the correct weight.

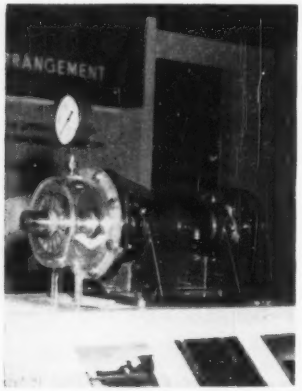
To discharge the batch from the hopper into a mixing bowl, a second pushbutton is depressed. This starts another vibrating conveyor, which moves material from the hopper to the bowl. The weigh-out interceptor then moves toward and under the photocell to shift to dribble feed and stop the vibrator as the interceptor passes beyond the photocell.

NEWEST EQUIPMENT For Food Processors

Here is a special 4-page picture-parade of the latest machines, instruments, and accessories for "doing it better." Displayed in the recent big Chemical Industries Exposition in New York City, all were spotlighted for jobs in the food plant



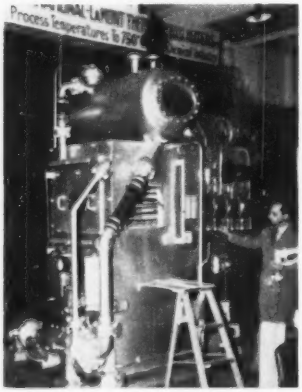
ALL LEAVES are exposed at once on this Niagara horizontal filter. Monorail is integral part of unit. (78A)



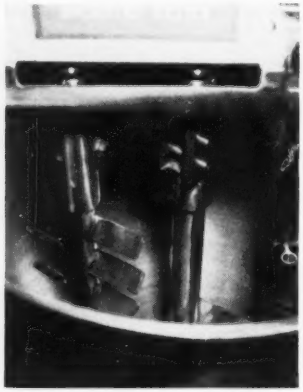
EQUISEAL SLEEVE, displayed by Allis-Chalmers, keeps abrasives out of pump stuffing box and eliminates leakage. Balanced pressures do trick. (78B)

LEVEL of bulk materials or liquids, in bins or tanks, is regulated with self-contained float put on view by Stevens-Adamson Mfg. Co. (78C)

FREEZE-DRYING unit for research, shown by Proctor & Schwartz, dries heat-sensitive foods while frozen, without chemical or biological change. (78D)



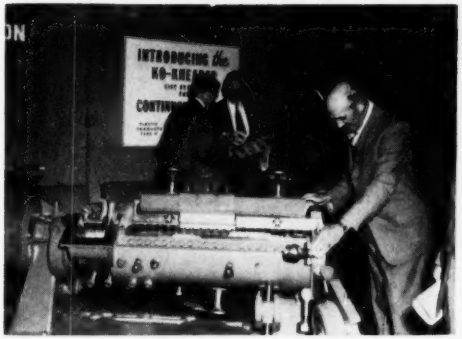
THERMAL LIQUID heater uses forced recirculation principal for operation up to 750 deg. F. Shown by International Boiler Works. (78E)



ALL AGITATOR parts are quickly removed, for fast and thorough cleaning, from sanitary, steam-jacketed, heavy-duty mixer. Groen Mfg. Co. (78F)

VISCOSITY readings are given directly in centipoises by this compact, easy-to-read electroviscometer exhibited by Fischer Scientific Co. (78G)

Processing Units for Solids and Liquids



REVOLUTIONARY Baker Perkins Ko-Kneader is List-design unit for continuous, more-efficient mixing, kneading. Applications are diversified. (79A)

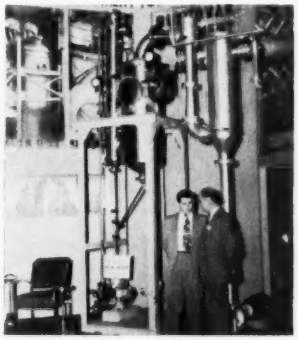
PFAUDLER introduced a new acid-resistant glass lining that incorporates improved resistance to alkaline solutions. Ranges: pH 9 to 12, temp. to 212 deg. F. (79B)

IN THIS Pangborn dust collector, any bag can be inspected, removed, or replaced without disturbing adjacent bags and without use of tools. (79C)

UNIQUE action of Scott & Williams' new sanitary pump isolates fluid in process from any contact with actuating mechanisms of the unit. (79D)

COMPACT and portable electric pH meter was demonstrated by Coleman Instruments, Inc. Accurate to within 0.05 pH, unit uses dry cells. (79E)

SANITARY design and easy cleaning are featured in new Rietz angle disintegrator. All working parts can be readily removed for cleaning in less than 2 min. (79F)



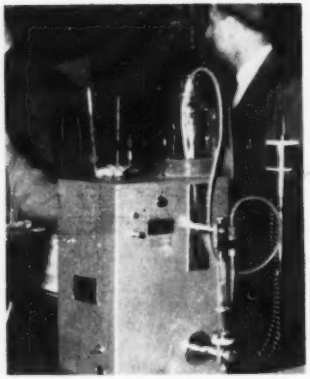
NEW PILOT EVAPORATOR was displayed by Buflovak. Low-temperature, high-vacuum unit is falling-film, tube type. Vacuum is drawn by steam-jet. Construction: Stainless steel. (79G)

POLYETHYLENE pipe-flange shield protects equipment and personnel, permits visual detection of leaks. Wilmington Plastics, Inc., makes them. Units go in without tools. (79H)

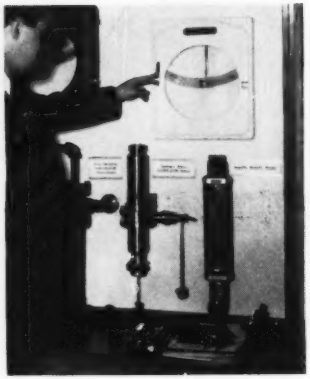
Want more information about any items in this photo article? Just circle key number (in parentheses at end of each caption) on Reader Service Coupon adjacent to inside back cover.

Turn Page for More New Units →

Laboratory Instruments . . . Coolers and Feeders

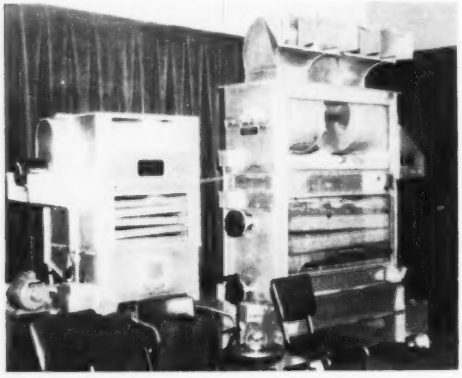


AUTOMATIC pipette, shown by Scientific Glass Apparatus Co., is designed for high precision, at any setting, in dispensing liquids, semi-solids. (80A)

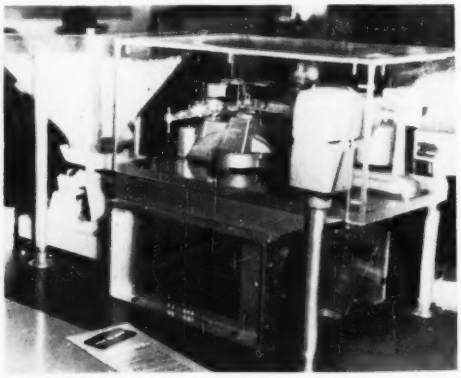


SANITARY dairy Flowrator for continuous, accurate proportioning of ice cream mix ingredients was on view at Fischer & Porter booth. (80B)

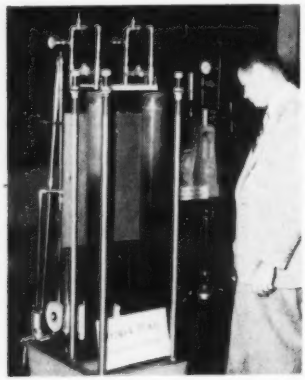
TIME-FLOW fraction collector, displayed by Technicon, is remote controlled unit that garners liquids in test tubes by drops. (80C)



NIAGARA BLOWER exhibited Hygrol No-Frost unit for preventing all freezing or frost formation at low temperatures. Dual assembly is seen here. (80D)

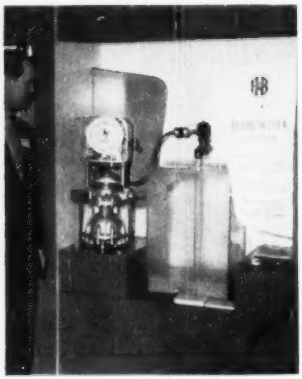


CONTINUOUS feed of small quantities of ingredients is possible with this new Waytrol. Exhibitor of equipment was The Jeffrey Mfg. Co. (80E)



HARD-TO-PUMP slurries and highly viscous pastes are reported transferred with ease by this Hydrex pump displayed at Mauton Gaulin Mfg. Co. exhibit. (80F)

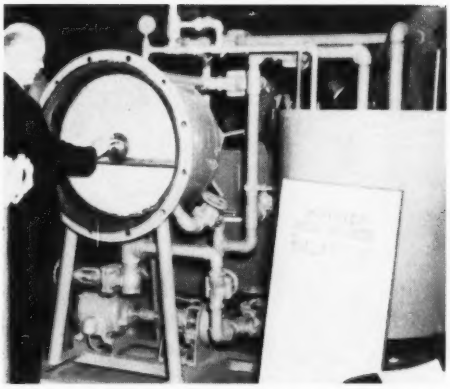
CONTINUOUS dispersion of pumpable materials of high viscosity is obtained via fast-acting mechanism of Dispersall unit on view at booth of U. S. Stoneware. (80G)



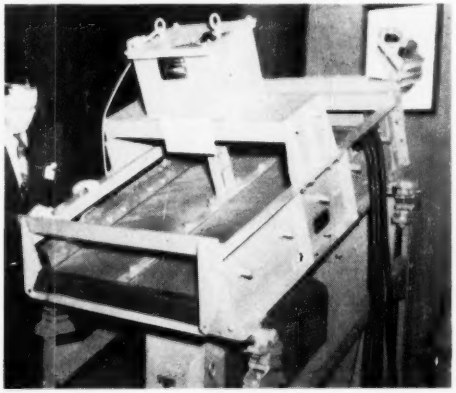
THIS Fluidometer, shown by Herrington & Benner, is unit specially designed for automatic metering of light or heavy liquids in batching operations. (80H)

Labeler, Filter, Dryer, and Separators

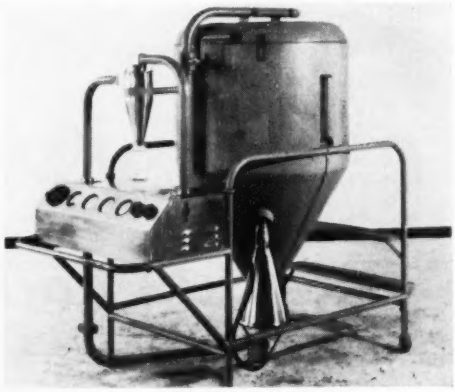
THIS UNIT, exhibited by New Jersey Machine Co., puts glue-less labels on containers at rate of 300 per min. (81A)



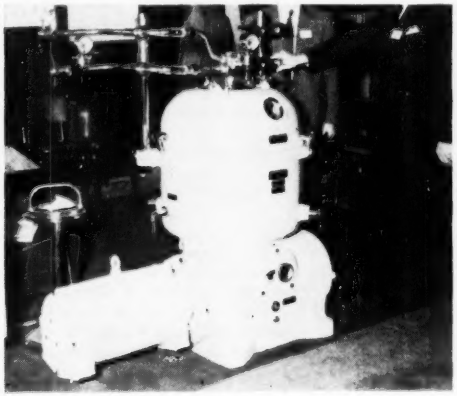
SELF-CLEANING pressure leaf filter, shown by Hercules Filter, can be cleaned by turn of a few valves. (81B)



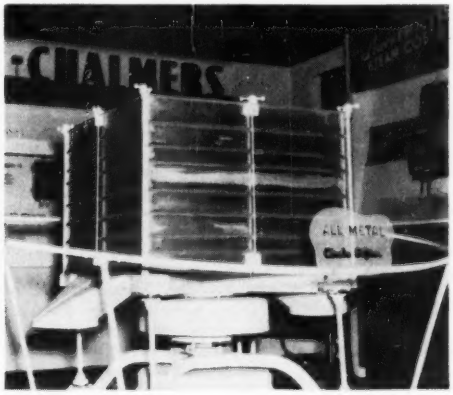
SEPARATING of damp materials is reported improved by employment of electrically heated screen. Maker of the unit is W. S. Tyler Co. (81C)



SMALL SCALE portable spray dryer was unveiled by Nicols Engineering. Controls are centered on instrument panel. Conveniently placed for operator. (81D)



SELECTIVE separation of liquid mixtures into component parts is job done with special Centrico, Inc., solvent extractor. Compactness is feature. (81E)

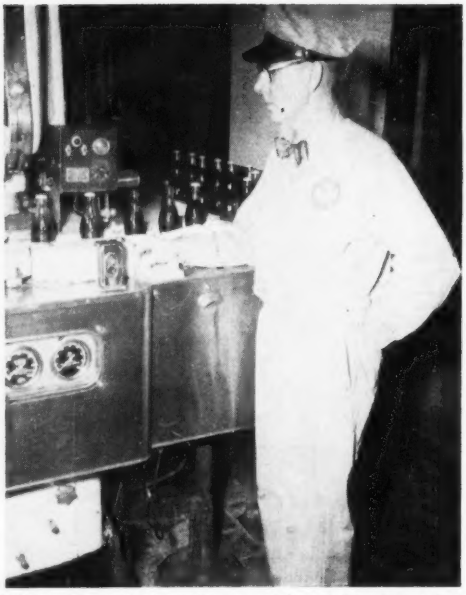


ALL-METAL sanitary sifter was seen in Allis-Chalmers display. It is designed for easy and speedy disassembly. "Circle Sifter" is name of unit. (81F)

From Prototype . . .

ORIGINAL capless-unit detector, made from spare parts, is exhibited on grocery counter by Inventor Gingrich. This contrivance proved that his basic idea was sound.

. . . To In-Plant Model . . .



NEXT, this in-plant version was fabricated and installed in Kewanee Coca-Cola plant. Gingrich became routeman during tests, thus was on hand to expedite improvements.

Device Licks *Packaging "Bug"*

How an inventive grocer solved a local food-plant problem—and wound up with a nationally marketed unit that keeps package-sealing operations "on the beam"

FE STAFF

"How can I prevent the pile-up of capless units on my bottling line when the cap feed jams?"

That question was posed by the manager of the Kewanee, Ill., Coca-Cola plant in the course of a conversation, several years ago, with an inventive local grocer.

The answer was quickly obvious to the electronically minded grocer, Claire Gingrich. And today, as the result of a casual remark, the Barnes-Gingrich Electronic Detector is available to any food processor with analagous problems.

It's a simple, low-cost streamlined unit which mounts above any container line and is designed to pick up and signal variations in package sealing at speeds as high as 1,000 per minute. And it's already proved its worth in interesting "non-Coke" applications.

It will function on beer, wine, and orange concentrate lines. For catsup bottles it works well also. And though milk lines present a problem—the fluid product is too light-reflective—it will pick up the absence of hoods after the milk is capped.

How It Functions

Gingrich's basic idea involves the "electric eye" principle—calling for employment of a photo-emissive type tube. He reasoned that such a tube, set just above the bottle top, could be energized by light reflecting off the cap from an external light source.

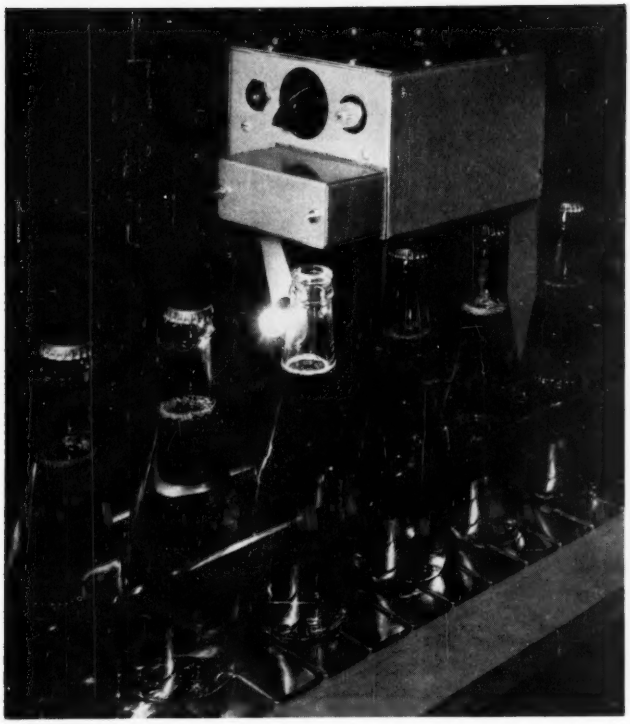
He then rigged up an electrical circuit with a thyratron tube in connection with the phototube for triggering, amplifying, and rectifying alternating current pulses for mechanical relay purposes. Circuit components are housed in a compact cabinet which can be mounted adjacent to and over the bottling line. From this, the photocell projects out over the bottles, flanked by a similarly projecting No. 88 lamp.

Thus, as long as a reflecting surface—bottle cap—is below this sensing cell, light will be bouncing up to energize the photo-electric circuit. Conversely, absence of reflection due to the lack of a cap would be indicated by a de-energized circuit.

A second light source—in the form of a lamp mounted below and to the side of the photo-cell—keeps the circuit energized when no bottles are under the device. This is blocked off, of course, by the bottle itself when it passes by. It thus requires the presence of a bottle and the absence of a lid to provide a control signal from the thyratron-operated relay.

Several refinements had to be added by the inventor to smooth up his basic idea into an easily used, flexible

. . . To Commercial Unit



OFFERED in handsome functional "package," commercial unit is now available to all. W. F. & John Barnes collaborated on final design.

package. For example, an external sensitivity adjustment was needed to compensate the unit to varying room-light conditions and the reflectance value of each particular container top. A surface-mounted dial-type potentiometer served this purpose.

Added also were two external toggle switches, one for power supply and the other to cut out automatic relay action, if necessary. Moreover, it was soon found desirable to include an external neon lamp to indicate a proper initial potentiometer adjustment and which would glow whenever a capless condition was detected. And a gasketed opening was arranged to provide a view to show the operative the condition of the thyratron tube.

Gingrich's first model of his detector was quite crude. But with it he developed several design improvements in very short order. He soon noted, for example, that changes in ambient light affected the stability of adjustment. This was corrected by enclosing the projecting photo-cell and light source in can-like shields.

Then, too, any changes in line voltage seemed to upset the unit. Coping with this simply involved an adjustment in the sensing-cell shields and stepping up the power of reflecting light.

Trial and Improvement

After basic improvements in the prototype model, the initial commercial unit was built and installed on the 65 bottle-per-minute Kewanee line. This first in-plant detector realized all expectations, with comparatively little change required. However, those starting months in the plant indicated a need for a more water-tight construction—supplied in chrome-plated perfection in future models. And there was developed a mounting feature which permits a quick setting for bottles of various heights.

In the beginning, the automatic switching means furnished by the detector was aimed at "post mortem" action. It could be used to actuate a signal light, or buzzer, or could even stop the bottling line. Then the cause for capless bottling could be corrected.

But then someone came along with a much more elaborate—but feasible—idea: That an arrangement be made so that the line would shut down only after a certain number of capless bottles had passed. This would "gloss over" those small cap jams which frequently work out and do not warrant a line shut-down.

The inventor solved this one with typical ingenuity. A cam was mounted

(*Turn to page* 184)

What Successful Invention Involves

People just don't pull ideas for capless bottle detectors out of the air. Gingrich was no exception. First of all, he'd been playing around with electron tubes as a hobby. And to sharpen his talent he took two University of Illinois wartime extension courses in electrical engineering and industrial electronics.

A visit to Gingrich's store will prove that his food unit was no "flash". First, the door will open before you grasp its knob—but it's not done electronically, simply by a pulley system. Then you'll notice the radio automatically tones down when the 'phone is used—another ingenious trick by Gingrich that undoubtedly could be used in many establishments.

So when the idea for a capless-bottle detector came it wasn't a cue to simply rush out and build the device—the inventor had an inkling of the time and effort the project could entail. Very wisely, he started by investigating the potential market for such a unit. A clincher here was when the Chief Engineer of Coca Cola encouraged him by letter.

Next step in the growth of the scheme was to work out basic drawings. Meanwhile, a lawyer's fee was paid for a patent search to determine if the idea was new—which was the case. And when armed with this reassuring information, Gingrich constructed a prototype model out of spare parts and tested it at the local Coca Cola plant to concretely prove its operational principle.

Thus, with a working model built and with the patent horizon unimpeded, an application was made in 1946 to the U. S. Patent Office.

Three years later, after what seemed like never-ending and rather costly patent litigation, the Gingrich detector was assigned patent number 2,472,945, dated June 14, 1949.

In the interim, Inventor Gingrich took a route sales job with the Kewanee Coca Cola Bottling Co.—thus was able to keep tab on the performance of his device and also get a better picture of its possibilities.

CONTINUOUS COOLER takes 7,000 oven-hot loaves of bread to room temperature in 90 minutes. But optimum results come only when fast-moving air is held within split-degree limits by advanced instrument system (right).

"Flighty" Process Kept on Beam by

New Split-Degree Control Technic

Damage to bread quality in 7,000-loaf continuous cooler avoided by precise "anticipating" regulation of air temperature and humidity

FE STAFF

At first glance, proper mechanized cooling of bread might only seem to require a straightforward application of atmospheric control. But as is usually the case when a simple principle is finally engineered into reality, there's much more to the problem than meets the eye.

That "part beyond" was given careful consideration in the installation of Read Standard's continuous bread cooler at Old Home Bakers, Sacramento, Calif. Integrated into the design of this cooler is one of the most precisely regulated systems of air conditioning ever employed in a food plant —or any other type plant, for that matter.

Close control is the secret of continuous cooling for maximum bread quality. Both the temperature and humidity of the circulating air must be held within extremely close limits. Here, the move to attain this split-degree accuracy led to one of the first food-processing applications of Taylor Instrument's revolutionary new "Transaire" temperature-transmitting principle—a dynamic temperature-sensing system.

Tribute to its performance is the praise of the Old Home Bakers' management—backed up by fraction-of-a-degree chart records, which are being filed as documentary evidence. Future Read continuous bread coolers will be similarly equipped.

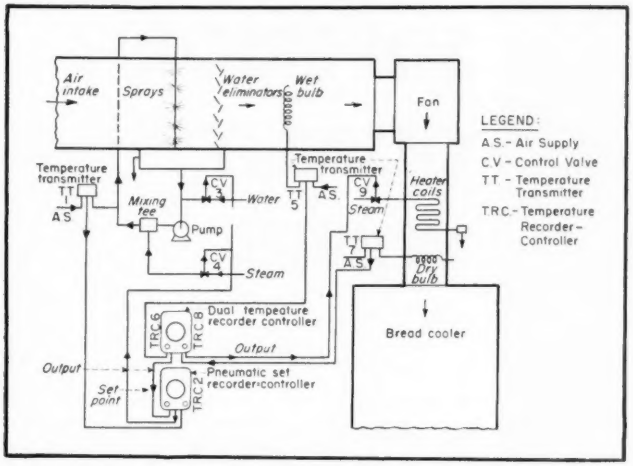
To Explain the System . . .

. . . we must first consider a few simple control fundamentals for fast-moving continuous operations. Standard temperature controllers involve too much time lag. Therefore, a derivative, or "rate," factor has been applied in air control systems. This provides anticipatory action. By positioning the control valve a proportionate distance ahead or behind the actual instrument measurement—when a temperature change is occurring—the undesirable "dead time," or measuring lag, of the thermal system can be cut to a minimum.

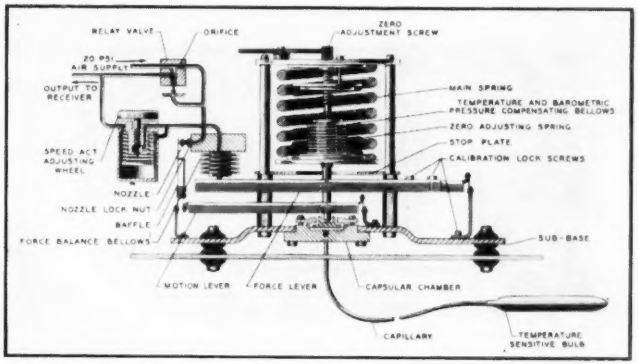
The Transaire principle—introduced in 1949—involves a unique use for the derivative technic. It couples a derivative-action pneumatic transmitter to the temperature-measuring system. The effect is to reduce lag to a new low by anticipating process changes directly at point of measurement.

Essentially, the derivative effect is provided by a variable restriction in

Solved by Advanced Control System



INTEGRATED CONTROL system which assures split-degree regulation of temperature and humidity even though moving air is difficult to control.



TRANSMITTING SYSTEM is mounted adjacent to the sensitive bulb directly at the process. Heat changes are dynamically sensed, mechanically amplified.

the transmitter output line between the relay valve and the force-balance bellows (see schematic illustration of transmitting system). If the process temperature deviates rapidly, the output of the transmitter (which actuates the controller) deviates more rapidly than it would without the derivative action. So the controller starts its corrective action sooner and minimizes process deviations.

Basically, the new technic is designed to overcome the inability of thermometric elements—particularly those in protecting tubes and wells—to closely follow fast-changing temperatures. Its derivative compensation is adjustable and can be set in accordance with the lag of each application.

Controlling the dew-point and dry-bulb temperature of rapidly moving air to within even a few degrees has always been a tough instrument problem. But tests convinced Read engineers that full benefits in mechanized bread cooling would only be realized when atmospheric conditions in the cooler were held within a fraction of a degree.

Initial inspection of the cooler itself would seem to belie the critical nature of the control application. It is a sizable unit—80 ft. long, 12 ft. high, and 10 ft. wide. And it holds 7,000 loaves in its moving trays. Further, its loaf retention time is all of 90 min.

But despite this capacity, even small changes in the rapidly circulating cooling air have undesirable effects. Insufficient humidity in the cooler will cause an excessive loss of moisture from the loaves. High humidity, on the other hand, brings a moist, mold-inviting crust. Moreover, an elevated air temperature results in excessive loaf dehydration, and too rapid a cooling has the unhappy tendency to cause crust cracks.

How New Controls Function

The system that supplies conditioned air to the cooler consists of an air-intake, spray section, water eliminators, blower fan, and heating section. Incoming air is saturated by the spray water and then heated to the desired temperature and relative humidity before entering the cooler. Water for the spray is heated by blending with steam in a mixing tee. Excess spray water is collected and recirculated.

Primary instrument problem, then, is to assure that the heater section gets a constant supply of saturated air at a given temperature. This is accomplished through (1) the action of two temperature transmitter units, and (2) the interlocking function in the pneumatic controllers which the transmitter units actuate.

Temperature transmitter TT-1 (see the integrated control system diagram) measures the temperature of water going to the spray. Output from this transmitter actuates the control mechanism of a pneumatic set temperature recorder-controller (TRC-2)—which, in turn, positions control valves CV-3 and CV-4 in the water and steam supply lines. Thus, spray water is kept at a constant temperature despite fluctuations in water supply and recirculation rate.

"To Suit Any Variation"

However, this simple maintenance of spray temperature will not account for heat and moisture changes in the incoming air. To cope with this variable, temperature transmitter TT-5 is installed to function as a dew-point transmitter, with its wet bulb located in the air duct downstream from the spray section. Output from this unit actuates recorder-controller TRC-6 (part of a dual unit) which, in turn, provides air pressure to position the spray-water-temperature set-point in the pneumatic set controller.

In this manner—by dynamic measurement of any deviations of saturated air away from the dew point—the water spray temperature is automatically adjusted to suit any variation in the quality of the air that is entering the system.

A third temperature transmitter, TT-7, measures the temperature of the air going into the cooler and actuates recorder-controller TRC-8. This latter unit regulates the flow of steam to the heater coil through the action of a control valve CV-9.

SUPERIOR QUALITY WINES

By applying advanced technics to time-honored methods of processing, New York State vintners carefully control production of full-flavored wines that boast exceptional keeping properties. Highlights: Judicious selecting and harvesting of grapes, special prepressing, fermenting only juice with pure yeast strains, slow ageing, prevention of contamination, and meticulous clarifying and bottling

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

To make wines of best quality requires grapes of best quality. Thus, superlative flavor of product begins on the vine. And it is enhanced by the vintner's constant care in processing.

Despite pressures tending to affect their operations, New York State wineries have chalked up the policy, "No quality variation." Demand, thus created by high reputation of the wines, has accordingly spurred the vintners to increase production—without curtailment of standards—by planting new vineyards, purchasing advanced equipment, and adding cellar capacity.

Control at Vineyards

Selectivity in the picking of the grapes is a science of personal care. For weeks before the harvest, wine experts "practically live" in the vineyards. The vigil continues until the precise moment when the grapes reach peak ripeness for winemaking. Then, drawing on long experience, these men determine the optimum acre-by-acre sequence for picking—and the harvest is on.

Checking one firm's practice, it is only after the winemaker has indicated the grapes suitable that the company-owned trays are issued to the growers for gathering the selected fruit. Upon arrival of the grapes at the winery, the winemaker himself attends to the sorting at the scales.

The exacting technic of harvesting evidences the careful attention to details that makes for superior wines. After reaching full ripeness—but not over-ripeness—grapes are

gathered in the Finger Lake's vineyards, preferably during bright weather, after the morning dew has evaporated from them.

To prevent taste-affecting damage that might occur from dumping the grapes in large containers, the fruit is gently placed in 40-lb. trays. Then, as a further precaution against crushing the berries, these trays are carefully nested, either on trucks or horse-drawn sleds, for easy journeying to the wineries at the foot of the hills.

Nature Given a Leeway

Speed and bustle of mass-production methods are entirely absent. Time and infinite care govern practically every processing step. Only call for speed is in getting the grapes from stemmer and crusher to the presses.

The producers traditionally work to protect the true taste and character of wines in still another manner: They ferment the partially clarified juice rather than the must (crushed skins, seeds, and pulp).

In these small plants, processing of the wines is under both the direct supervision of expert winemakers (men who brought the time-honored methods to the Finger Lakes' region, or their descendants) and the scientific control of the laboratory. Triple goal in a good wine is excellence of flavor, bouquet, and body.

Grapes coming in at the wineries, are initially inspected for maturity and defects. If accepted, each truckload of grapes is weighed on a platform scale.

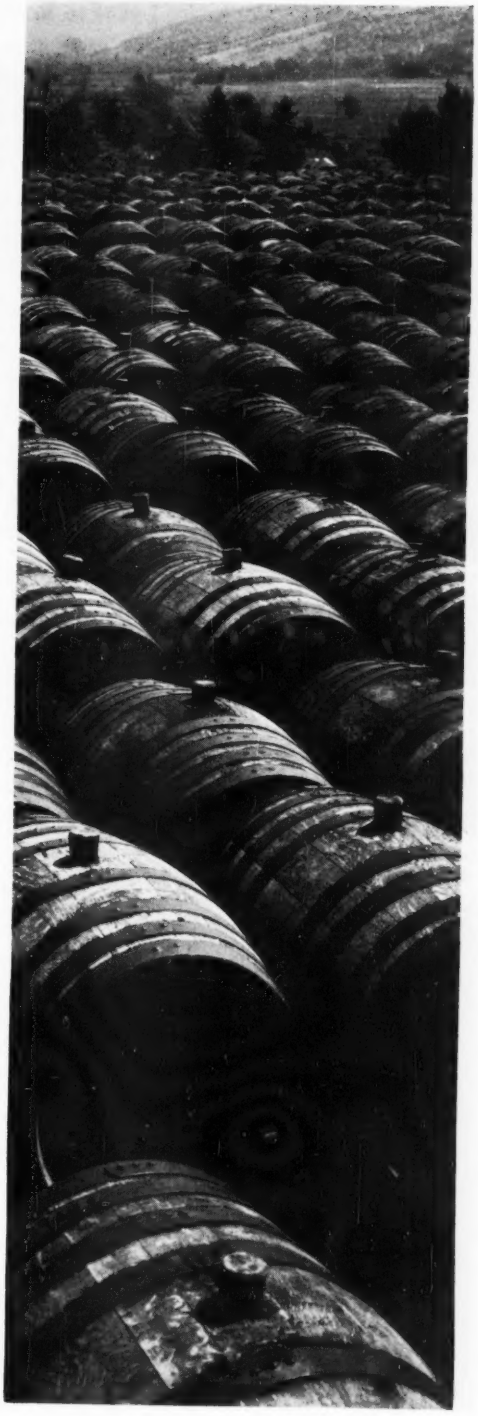
Stemming and crushing are the next steps. Grapes are fed into a stainless steel stemmer, which consists, in most cases, of a 3x7-ft. rotary drum with ¾-in. openings. Staggered inside this drum are a series of blades, mounted on a central shaft. As these blades turn, they force the grapes through the drum openings into a small surge tank and, at the same time, the lighter stems are carried out of the stemmer and collected in a concrete pit.

Before another load is received, the empty lug boxes are stacked back on the truck, which is then reweighed to get the net weight of the shipment. Quick handling of empties in this manner eliminates congestion at the stemmer. What's more, these empties are returned to growers with a minimum of delay, thus enabling them to operate with a smaller inventory of lug boxes.

Grapes are usually crushed as they are pumped through stainless steel pipes to the pressing room. Capacity of these centrifugal pumps ranges to 700-800 gal. per min. Mashing of the fruit is accomplished by the pump's impeller blades.

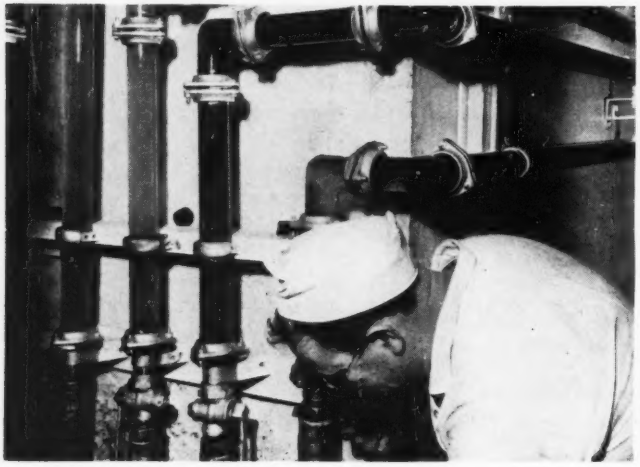
Preparing the Juice

Noteworthy in the making of top-quality wines in New York State is the pre-fermentation pressing. Little color is pressed from the white grape skins, thus accounting for the light shades in the white wines.

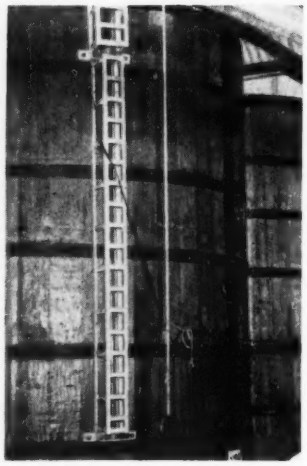


NATURE can't be hurried. Into 50-gal. oaken butts seen in these panels go 1-yr.-old sherries for 4 yr. of ageing. This slow mellowing technic is Widmer's adaptation of the centuries-old Solera sherry-making technic used in Spain.

Glass Piping Protects Wines From Metal Contamination



FOR TRANSPORTING wines from one cask to another, Pyrex-glass tubing is used. Metal pick-up is averted, thus checking haziness in the wines.



ALUMINUM crash guards are used to protect glass pipes from damage.

However, tehe opposite is true for the red grapes. To extract the red skin pigment and subsequently to produce the ruby richness sought in the matured red wines, the crushed grape pulp is heated before pressing. Approximately ½ percent of filter aid is added to the red pulp as it is heated for 10 min. at 140 deg. F. in stainless steel, steam-jacketed kettles equipped with vertical agitators.

There are three benefits in adding filter aid to the pulp: (1) Pressing time is reduced, (2) stripping of juice-free pulp from press cloths is greatly facilitated, and (3) rough clarification of the juice takes place.

At this point, both the red and white grape pulps get two pressings—first, the free run, and second the hydraulic pressing. In the case of the free run, a 2,500-lb. weight is employed to press juice from the pulp. This weight-extraction takes about 15 min. Generally, the resulting first-run juice is used to make Champagne (from white juice) or Sparkling Burgundy (from red juice).

Now to pressing the second-run juice. The rack of weight-pressed grape pulp (cheese) is rolled over rails to the hydraulic press. Here, under 1,500-3,000 psi., the remaining juice is squeezed from the pulp. Second-run, or hydraulically pressed, juice goes to make the many varieties of still wines.

Factor determining the pressure applied by the hydraulic press is the variety of the grape. For instance, the soft-pulp Elvira grape, requires only 1,500 psi. On the other hand, approximately 3,000 psi. are needed to press the hard-pulp Catawba variety. Some 160-170 gal. of juice is pressed per ton of grapes.

These wineries employ either linen or Nylon press cloths. Some prefer linen, stating it withstands higher pressures before bursting.

Nylon, according to others, has these advantages: First, juices flow more readily through it. Second, these cloths are easier to clean, since the fibers do not absorb moisture. And third, Nylon does not color-stain as easily as linen.

Cloths are machine-washed, after every second or third pressing, by laundry equipment capable of cleaning and rinsing 14 press-cloths every 10 min.

Used to cleanse the wooden press-racks is a piston-type pressure pump, attached to a rubber hose and a spray nozzle. Operating under 300-400 psi., this unit sprays 150-deg.-F. water on the racks, thus easily loosening and washing off the tenacious dried pomace.

One winery lowers a thin-gage, stainless steel guard over the pulp cheeses to prevent the juice from squirting onto workers and on the floor and walls during the pressing operation.

Advantages of Pyrex Pipes

Pressed juice is now ready for fermentation. Hot red juice coming from the presses is rapidly chilled to 70 deg. F. as it cascades over a series of vertical, stainless steel, well-water refrigerated cooling plates. Leaving the presses, the juice flows into wooden or glasslined holding tanks, from which it is pumped through $1^{3}/_{4}$-in.-dia. Pyrex glass pipes to fermenting vats.

These stationary glass pipes were installed to prevent metal pick-up by wines and thus avoid subsequent formation in the bottled wines of "metal casse" (haziness attributed to the precipitation of organic complexes of ferric phosphate, or to a reduction of copper to the cuprous state).

There is another benefit in using the stationary glass pipes. Considerable time and labor are now saved in racking and transferring wines from one cask to another. Formerly, rubber hoses with bronze fittings were employed, and much time was lost in dragging them around the plants, and then assembling and disassembling them.

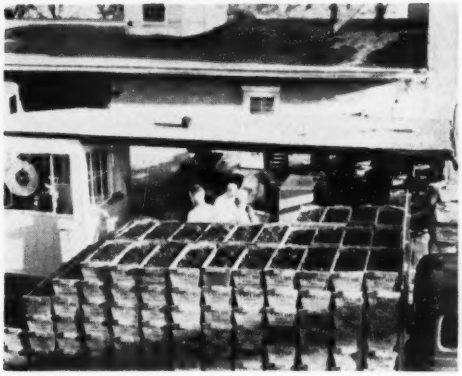
It is interesting to note that one winery has almost two miles of Pyrex piping. In exposed locations where the glass might be vulnerable to breakage, some plants employ Plexiglas or aluminum crash guards to protect the pipes. This has cut down breakage of such pipes from such causes as an accidental flip of the coupling end of a hose, or sharp impacts by tools or equipment.

The glass pipes are designed to withstand 400 psi. Yet, in pumping wines through them, one producer does not go above 100 psi. Another has jointed the pipes with rubber gaskets so that sudden surges in the line thus tend to burst the gasket instead of the pipe. All Pyrex pipes are cleaned once a week with 180-deg.-F. water. And after each use, they are flushed with water.

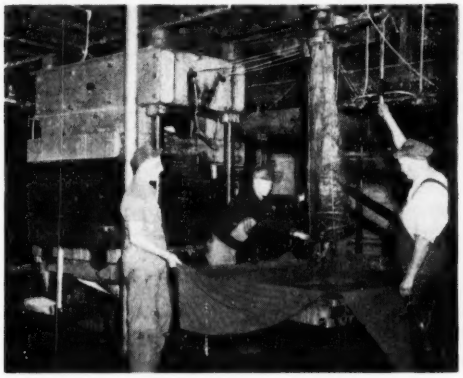
The high-acid content of New York State grapes is responsible for the picking up of haze-producing metals

Care Gets Accent in Harvesting, Pressing, Fermenting, Filtering

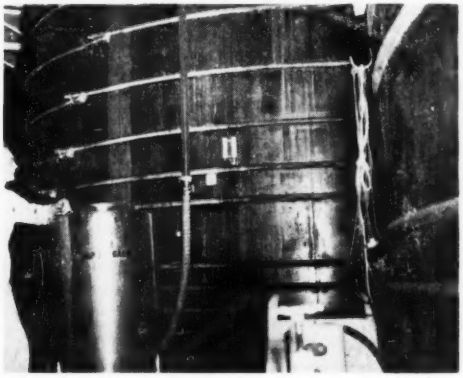
ONLY WHEN they have reached ideal wine-producing maturity are grapes selected for picking. Clusters are gently placed in small boxes, nested to prevent crushing.



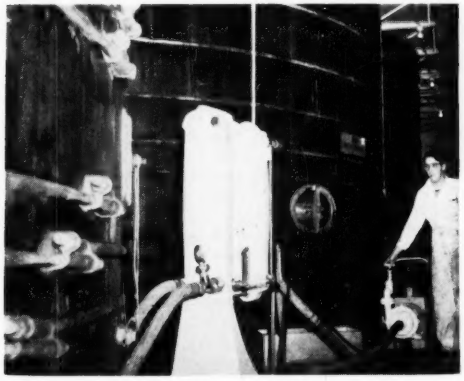
QUICKLY dispatched to hillside wineries, juice-swollen grapes are immediately inspected for possible defects. Sorted grapes then go to stemmer and crusher.



JUST ONE step calls for speed—pre-fermentation pressing. Here, at Pleasant Valley winery, white grapes are cold-pressed; reds are hot-pressed to extract skin color.



PURE, cultured yeast is introduced in vats containing pressed juice. Scientific control of cultures assures consistently fine quality wines year-in and year-out.

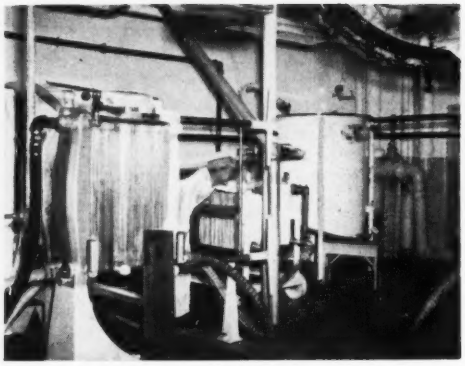


FERMENTATION proceeds slowly. Small vats are generally used in order to retard heat, which causes spoilage. Heat-exchanger (foreground) is employed with large casks.

FOR CLARIFICATION of fermented wines, Taylor uses this typical Niagara plate-and-frame filter. Plates are precoated with filter aid (diatomaceous earth).

FINAL STEPS: Ageing and Clarifying . . .

DOWN IN COOL Pleasant Valley cellars, wines are filled to minimum headspace in casks, then aged.



DESSERT WINES are prepared for bottling by running them through pasteurizer (left), then filter (center).

by juices and wines that come in contact with equipment and fittings made of iron or copper. To prevent the subsequent undesirable cloudiness in the bottled product, these producers have installed glass-lined metal tanks, stainless or Pyrex pipes, and stainless pumps, fittings, stemmers, filling machines, and bolts for storage casks. Also, steel manhole covers are plastic-coated to prevent metal pickup.

Pure Yeast Cultures

Fermentation is started by innoculating pure yeast cultures into vats containing the juice. One winery first introduces laboratory-grown yeast strains into stainless steel, portable tanks containing approximately 120 gal. of pasteurized juice. Then, after incubation at 70 deg. F. for three days, the vigorous yeast culture is introduced into a glass-lined tank with 1,000 gal. of juice.

This juice is either treated with 75 ppm. of SO_2, pasteurized at 180 deg. F. in a heat exchanger, or clarified in a germ-proof, asbestos filter.

After two days' fermentation, the yeast culture is then added to the 120-gal. portable vats, which are next rolled to 7,000-gal. fermenters. Then the 2 percent yeast innoculant is pumped into the fermenters. And fermentation goes on for about two weeks.

It is necessary, during the fermentation of large batches, to control the temperature of the wine by recirculating it through a heat-exchanger. Regulation of temperature is required because the desirable yeast is known to function best at 70-80 deg. F., whereas temperatures above 90 deg. F. retard fermentation and support the growth of unwanted spoilage bacteria.

Fermenting rooms are equipped with circulating fans to drive out the CO_2 gas generated during fermentation.

Another winery ferments the juice in progressive stages. About 2 percent pure yeast culture is added to 200 gal. of juice in 2,500-gal. oval-shaped casks made of seasoned white oak. Then, day by day, 150 gal. of juice is introduced to keep fermentation going vigorously without the generation of too much heat.

Still another winery regulates fermentation by adding to the juice 50 ppm. of SO_2 and 2 percent pure yeast culture. And then it ferments only about 1,000 gal. of juice at a time in order to keep precise control of the temperature.

Laboratory Control

Before fermentation proceeds, the juice is laboratory-tested for acidity and for sugar content. If the acid runs too high, sufficient water is added to bring it to the proper

About State's Types in General, Varietals in Particular

Most notable grape varieties grown in New York State are Catawba, Clinton, Delaware, Dutchess, Elvira, Isabella, and Ives. These grapes enable the vintners to make full-flavored wines of exceptional stability and keeping qualities.

Wines are divided into two general categories—still and sparkling. The stills are those which, after fermentation, are racked, clarified, filtered, and aged in storage casks. Sparkling wines fall into three classes: (1) Those in which secondary fermentation takes place in the bottle, (2) those in which this fermentation occurs in bulk, and (3) those which are carbonated.

Grapes used to make the State's superb dry white wines include the above-named Catawba, Delaware, Dutchess, and Elvira, and also the Diana, Niagara, Riesling, and Salem. The zestfully tart red table wines—pressed from the aforementioned Clinton, Isabella, and Ives, as well as the Concords—possess taste characteristics that are difficult to duplicate.

As for wine varieties, there are several times more kinds of dry whites than reds—and this is reflected in the fact that production of dry whites in New York State surpasses that of the reds by approximately 75 percent.

One of the wineries produces authentic vintage wines. According to Federal law, a vintage wine is one solely derived from one year's grapes grown in one viticultural district (such as the Finger Lakes), the wine then being kept in cellars, and finally bottled and corked.

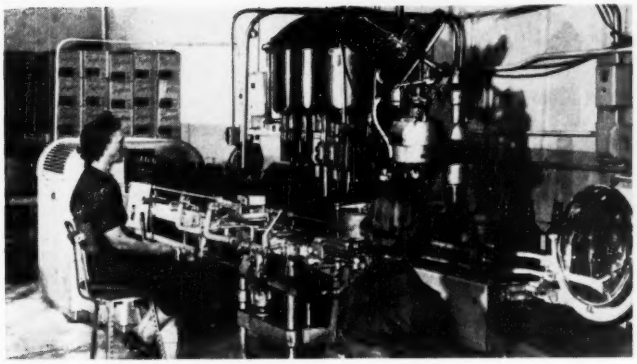
100 Percent Is Criterion

Some of the State's wineries produce varietal wines, named according to the grapes from which they are pressed. By law, these must contain 51 percent of the specific wine. However, New York State vintners insist on 100 percent, thereby achieving trueness of taste not found in blends. Typical dry varietals include:

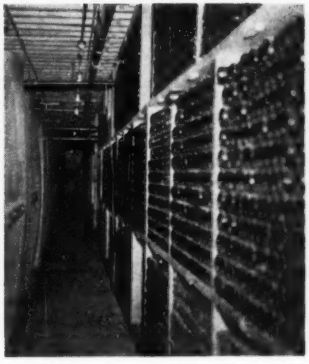
Catawba—Made from an exquisite pink grape that flourishes in the Finger Lakes section. It is the base for many Champagnes and numerous blended wines. The Catawba varietal wine has a flowery bouquet and a full flavor. It is preferred by those who favor sweetness over dryness.

Delaware—A frequent choice of con-

. . . Then Bottling and Storing



AT TAYLOR'S, high-speed unit fills wines into bottles. Capped bottles are inspected with aid of magnifier (right).



IN THESE bins, Widmer stores bottles of properly aged wines.

level. On the other hand, if the sugar content is too low, a calculated amount is introduced to ferment the juice to an 11½ percent alcohol content for Champagne, or a 12½ percent alcohol content for still wines. Glass-line tanks, equipped with agitators, are employed for mixing sugar and water into the wines.

Racking the fermented juice comes next. A racking faucet is attached to the line-stop valve at the bottom of the fermenter. The faucet is then opened and the wine flows into a stainless steel, rectangular sump (2½x1x1 ft.). A female couple at the end of a rubber hose is hooked up to a male unit at the bottom of the sump, and the wine is now pumped at a rate of 3,500 gal. per hr. to the filtering station. The fermenter is finally emptied by knocking out a 6-in. tapered wooden bung in the bottom of the vat and catching the lees (sediment) in the stainless sump.

Filtering practice in one of the larger wineries is as follows: First, a stainless steel plate-and-frame type unit is precoated. Filter aid is then mixed into 200 gal. of wine, in a stainless steel vat, by means of a vertical propeller-type agitator. The wine and filter aid slurry is next recirculated from the mixing vat through the filter and back to the mixing vat. Flowing through a properly precoated filter, the wine becomes crystal clear.

Now, more filter aid is introduced into the slurry tank. Then the main stream of wine from the fermenter is blended with a small stream of the filter-aid slurry fed to the filter through a 1½-in.-dia. stainless steel pipe.

Ageing Wines

Coming from the filter, the wine is filled to a minimum headspace in oval storage casks—another quality control measure. Object of keeping headspace in these casks at a minimum is to prevent acidification (oxidation of alcohol to acetic acid or vinegar).

Storage and fermenting casks are usually sterilized with SO_2, which is introduced within them by burning strips of thin sulfur-coated cotton cloth.

Clarity is one of the quality factors especially desired in wines. Turbidity is attributed to the aforementioned iron and copper haze, or to suspended solids, or cream of tartar.

As stated, metal casse is eliminated by the use of corrosion-resistant equipment. Suspended solids settle out during aging and are removed by repeated racking. To assist flocculation and settling of finely suspended colloidal matter, some wineries use Bentonite—a fining (clarifying)

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noisseurs, made from a small, light red grape. The finest wines of the Finger Lakes region are either straight Delawares or blended Delawares. Pale gold in color, these wines compare favorably with the softer wines of the Rhine.

Diana—This wine is even lighter and more bland than the Delaware. Fine in color and aroma, it is made from pink grapes that are somewhat astringent to the taste. It is less known among consumers, but many New York producers hold it in prime favor among white wines.

Dutchess—Produced from the light green, thick-skinned grape, this wine is clean, mildly tart, and zestful. To obtain the Dutchess grape at its best, the harvest is delayed through the first light frosts of Autumn.

Elvira—This varietal is pressed from small, green compact-clustered berries similar to the German Riesling grapes. The wine has a Moselle-like full flavor and aroma, hence enjoys high favor. The Elvira grapes, like the Rieslings, are picked late in the season. Hence, wines made from them have the distinction of being called spatlese (German for "late selection"). As the grapes mature, they develop edfaul ("noble mold" or "divine rot") which enhances the flavor of the wines. And since these grapes contain sufficient sugar to produce a product with a 12-percent alcohol content, the wine is termed a Natur wine ("natural").

Isabella—Among the red wines, this is one of the best for richness of flavor. Derived from the grape of the same name, it is marked by an especially appetizing color and fragrance.

Moore's Diamond—This white wine, produced from the Moore's Diamond grape (often mistaken for the Niagara), has a pronounced bouquet not unlike the wines of Alsace Lorraine and parts of Switzerland. It's fine qualities are seen stimulating its popularity.

Riesling—Wines made from the Riesling grape is acclaimed as among the finest of the native varietals. Availability of the grapes is limited, otherwise it is held that this wine would enjoy strikingly higher distribution and acceptance.

Vergennes—For decades, the Vergennes grapes have gone into casks of wines for the vineyardists' personal use. And this wine has likewise been winning notable market favor. The Vergennes grape somewhat resembles the Catawba in its pink color, but its bunches are somewhat smaller and more compact.

Process Highlights ⟶

Georgia frozen food packer builds superlative okra operation by (1) assuring a systematic in-flow of selectively grown and graded pods; then (2) speeding the product through an extra-care process on lines engineered to the job

1 **GRADED OKRA** is carefully capped so that knife cuts do not release juices, causing slickness upon cooking.

CONTINUOUS CONTROL
Clinches Quality, Curbs Waste

E. DALTON WHITE
FE Correspondent, Atlanta, Ga.

Sought by executives of Bateman Frozen Food Co., Macon, Ga., was Quality Dependability "with a capital Q.D." in the processing, packaging, and freezing of fresh okra.

And they got it by instituting an advanced-technic system incorporating constant attention to the product all the way from the field, through a new functional plant layout, to the freezer.

In fact they got more. For as a result of the new sharp-eyed operation, waste of product has been reduced to less than 4 percent—a notable economy, since the firm processes some 1,100 bu. of okra a day and turns out from 500,000 to 750,000 packages, all told, during the summer season.

"Indivisible Relationship"

Once study of the problem was launched, Bateman became highly impressed with the indivisible relationship between the raw and the finished product. This brought the decision that control should extend back to the farm—to include proper seed selection, cultivation, harvesting, and grading.

Put to work, this pre-plant program quickly demonstrated its efficacy by saving considerable work in the packing plant while at the same time giving the farmer a better return on his crop.

Okra is obtained in bushel hampers from shippers in Georgia, Florida, and Tennessee. Rapid hauls from fields to plant are encouraged to retain freshness of the vegetable. In the plant, okra is rapidly processed to retain color, firmness, and juices.

There is a lot more to processing and freezing okra than may seem apparent in a packing plant. President C. H. Bateman is a strong believer that if the frozen food industry is to continue its growth and gain wider consumer acceptance of its products, then the processed fruits and vegetables must be as near as possible to the nutritional value, appearance, and freshness as the original products coming from the fields.

Proper selection and grading, and careful attention to the small details in processing, make the difference between a high quality product and one which is merely acceptable. The design and construction of equipment, together with constant inspection and control assure better plant efficiency. Result: Effective processing.

Most of the equipment in the Bateman plant was either designed by company engineers or manufactured to their specifications. The two production lines were specially laid out to save space, yet provide ample working area for rapid processing of vegetables. Flexibility was of first consideration in the plant layout.

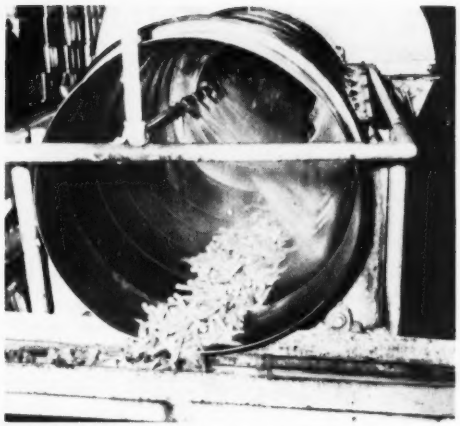
Grading Starts in Fields

Quality control in the company program starts on the farm in order to assure production of the proper type product. The grower is encouraged to provide the vegetable in the sizes and quality suitable for both the fancy and choice grades. This simplifies the grading problem at the plant, thus speeds processing. And a prime benefit is more economical operations.

Farm grading of okra is 1 to 3¼ in. for fancy and 3¼ to 6 in. for choice. The plant thus readily shifts its production lines to either grade, depending upon the volume of shipments. Fancy okra is packed in 10-oz. home packages and 2-lb. units for hotel, restaurant and institutional trade. Choice okra is cut into 1-in. lengths for soups, and packed in 2-lb. units.

Processing steps are generally conventional, but the technic used gives what the firm believes to be a better product. The difference lies in extra attention to selection and inspection with special care in processing from first to last.

2 **COLD WATER** from sprays (left), prewashes okra. Conveyor (right) carries washed product to blancher.



3 **DISCHARGED** from blancher, okra is rapidly cooled by cold-water sprays in this rotary screen drum.

4 **MOVING** along stainless steel wire-mesh belt (background), vegetables are drained while undergoing final inspection.

5 **PRODUCT** is neatly packed, and cartons are then check-weighed.

Main objective is to preserve the tenderness, flavor and crispness by processing as quickly as possible. It is estimated that it requires but 6-7 min. between processing and final freezing of the product.

Sealing-In Quality

Particular attention is given to the capping step so that the stem is cut just to the pod and not into the seed area. This technic seals in the juices, thus prevents the bleeding which is the cause of unwanted slickness when the vegetable is cooked.

Another important point is washing and blanching. Okra is sprayed with cold water before entering the blancher. This prewash removes any leaves, dirt, or other foreign matter from the okra, and the wetting allows for even heat distribution in the blanching process. Okra remains in the blancher for about 3 min. at 200 deg. F. to give it a rich, dark green velvet color.

The time in the blancher is important, since over-blanching tends to break down the tissues, makes the okra bleed its natural juices, and takes the crispness out the pod, leaving the vegetable soft and flabby. Such loss of quality at this stage of the process is emphasized when the okra is cooked.

Under-blanching leaves the okra dull in color. Furthermore, okra that is under-blanched develops gasses, during storage, that deteriorate the produce.

It has been found that liberal spraying with cold water in the washer, after blanching, and along the conveyor line, tends to keep the okra in best condition for freezing. The okra is thus quickly cooled to city-water temperature to prevent any tendency toward cooking.

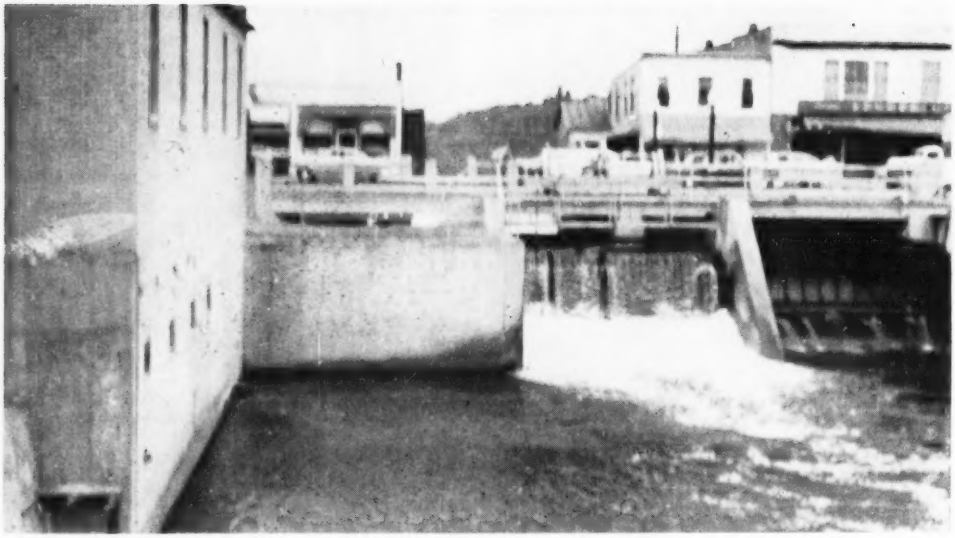
Continuous Draining of Product

The problem of draining the okra was solved by installing a stainless steel mesh wire belt on the final grading table. At this point, any off-color okra is discarded to waste along with those pods which show any blemishes. The movement of the pods at this point drains off surface water, and by the time the okra reaches the cartons for packing, the pods are dry. Thus, excess wetting of cartons is avoided.

Only experienced operators are assigned to grade the vegetable at this

(*Turn to page* 139)

LOW COST HP.: "Right by the door" and . . .



SOURCE of energy is this company owned dam across the Flat River alongside plant. Concrete flume (seen at left of falls) directs stream to turbine located in mill basement. Belts transmit power to equipment on all four floors.

THAT HANDY WATER POWER
Can Still Hold Its Own

Simple turbine directly coupled to mechanical transmission system continues notable 80-year record as King Milling's efficient and economical prime mover

FE STAFF

In this day of atom taming and electronic cure-alls any unadorned industrial use of age-old basic mechanics might seem to be a hark-back to the engineering of the original seven wonders of antiquity.

But occasionally one finds hold-outs in some industry or process—century old technics that refuse to give way either to the elaborations of Faraday or Nils Bohr.

The use of water power to mill grain is one of these. And King Milling Co. in Lowell, Mich., offers some strong reasons why this is so. Recently this plant removed a water turbine that had been the prime mover in its corn mill since 1869—and replaced it with an almost similar unit of larger capacity.

And as the old turbine was pulled out, it was noted to be still in good operating condition—capable of efficient performance after 80 years of continuous operation under water!

Durability and years beyond amortization are not the only reasons why King stays with this ancient method of power generation. The company reports that its water-drive has these four notable factors in its favor:

- **Superior smoothness and ease of speed adjustment**
- **No necessity for a special engineer to operate the system**
- **Remarkably little need for maintenance of any kind**
- **All told, dependable power at costs that are just about negligible**

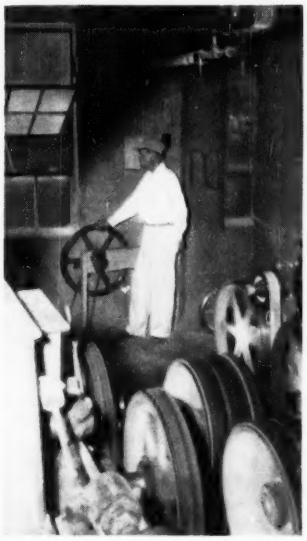
To get the water power, the company owns and maintains a reinforced concrete dam across the Flat River—a moderate sized stream feeding into the Grand River, which in turn empties 50 miles west into Lake Michigan. The dam provides an 11 ft. head for use by turbines located in the flour mill and the corn mill, which face each other across the lower stream. Two conventional lock gates are available to control the stream.

Turbine in Basement

In 1943 a fire destroyed the original flour mill, which had been operating since 1867. The present completely modern structure—with a 600-cwt. daily capacity—was erected in 1945 and employs reinforced concrete throughout.

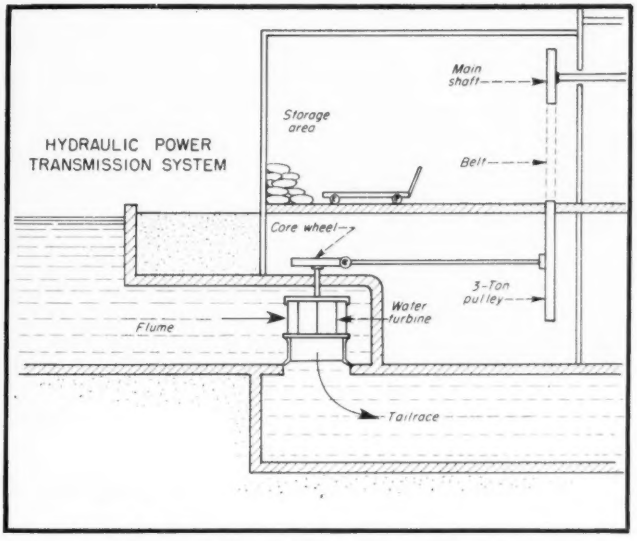
Water from the dam is directed, through a concrete flume, to a 145 hp. Leffel-Sampson turbine located inside a heavy-duty concrete housing in the mill's basement. Floor level here is

. . . easy to control



CHECKING water level from window, operator regulates turbine speed.

How it's put to work



FLUME water rotates turbine, which drives horizontal shaft through core wheel and pinion. Leather belting then relays power to floors above.

about even with the lower river and the turbine tailrace simply routes out below the floor and side of the plant, which is flush with the stream.

Rotation of the turbine—around 48 rpm.—is converted through its exposed vertical shaft and core wheel to a horizontal shaft by a pinion gear. The latter shaft traverses the basement and terminates in a 3-ton cast iron pulley that is directly belt-coupled to the primary shaft of the mill's power transmission system.

The primary or main shaft of the transmission system is suspended just below the ceiling of the packaging room on the first floor of the mill. And an 8-in. updrive turns a driveshaft suspended similarly above the second floor. Also, another 8-in. updrive from the second floor shaft motivates a short shaft extending below the ceiling on the mill's third floor—this latter unit providing power for the elevator.

Driven Equipment Listed

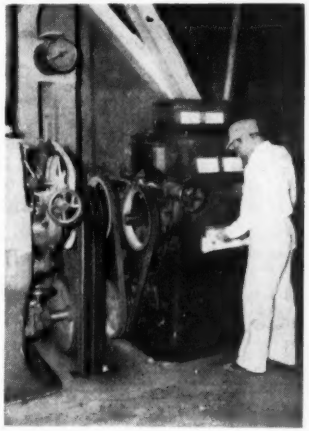
Through this hydraulic power network, the following equipment is run: Allis-Chalmers auger type packers (2); Pneumatic Scale flour packer; Dravers flour feeders (3); Allis 9 x 30 in. rolls (8); Allis six-section sifters (3); Allis 27 x 76 in. purifiers; exhaust fans (2); feed dusters (2); and Perfection dust collectors (2). Moreover, all wheat cleaning machinery is driven by the system—milling separator, Carter Disc double separator, Forster scourers (2), and hammer mill. And the mill's 28 leg elevator is also powered by the same network.

Only pieces of equipment exclusively electrically driven in the mill are the sewing machines, the two Wallace & Tiernan chemical dry feeders used for bleaching and enrichment, and the moving equipment in the company's 150,000-bu. grain storage department (powered by individual electric motors).

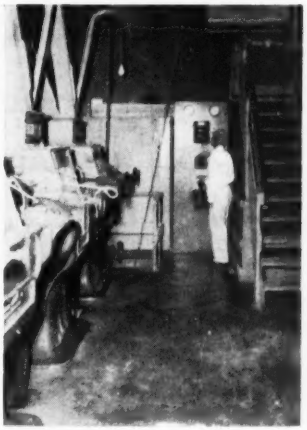
Speed of the transmission system at various points is geared up or reduced by an appropriate belting and wheel ratio. Thus the optimum turbine 48 rpm. is stepped up to as high as 550 rpm. on the fast rolls. At the same time, a special reducing system is needed to convert the speeded power of the third floor drive shaft to a suitable 45 rpm. to operate the elevator legs.

Actual speed of the primary drive in

(*Turn to page* 159)



EIGHT mills, similar to unit shown, are driven by hydraulic power. Dial indicates speed of fast-break rolls.



STAND-BY power is controlled from panel. Motor is used only in rare cases when waterhead is inadequate.

AFTER HARVESTING minutes-old corn is fed to husking machines (center) and then to belt (left) where workers grade out the culls before trimming

PRE-CHILLING. Cooling is effected with refrigerated, chlorinated water.

Fast Handling, Special Pre-Chilling Put

Profit in Prepackaged Produce

Engineered "half-hour" technic right on the farm cuts flavor losses, spoilage of fresh vegetables

READY-TO-COOK vegetables, delivered to the consumer in a "state of suspended, farm-fresh quality," are the products of Paul B. Dickman Farms, Ruskin, Fla.

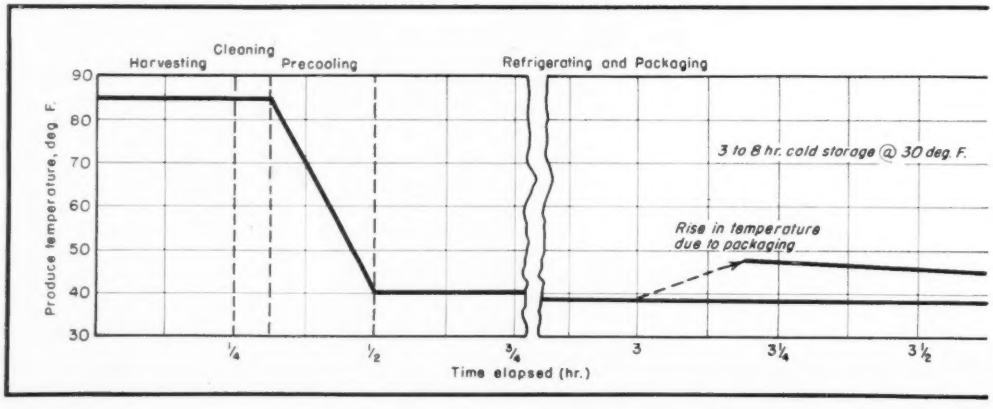
By means of a combination of "plain horse-sense" and food engineering, this producer has been able to make its farm-precooled and prepackaged goods pay their way and considerably more in the tough competition with conventional bulk goods.

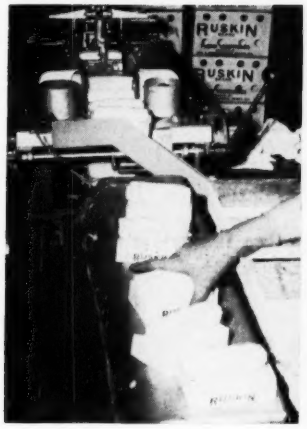
Success in this venture is due primarily to the following technics in the handling of the vegetables—

- **Conducting scientific tests to determine the best methods for precooling, packaging and trucking.**
- **Ultra-rapid movement from field to market.**
- **Immediate cleaning, chilling, and cold storage at the farm after harvesting to insure against flavor losses, carbohydrate breakdown, and spoilage.**

Corn, cauliflower, broccoli, lettuce, turnips, radishes, carrots, spinach,

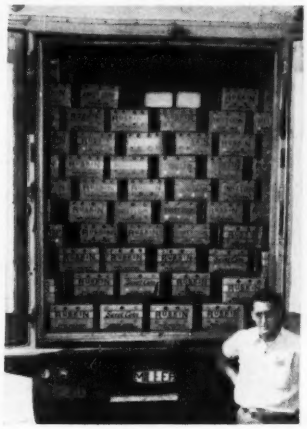
Time and Temperature Record of





WRAPPING of trimmed corn takes place immediately after cold storage.

CARTONING follows. Note one-inch ventilation holes for air circulation.



SHIPPING. Open-stacking, as shown above, eliminates hotspots in transit.

and other crops, are now being handled in the $200,000-prepackaging plant in Ruskin. Corn, however, is the big item.

The entire process cycle, from field to cold storage, takes hardly more than a half hour. And less than two days later markets as far away as St. Louis and Chicago receive the shipments.

Here are the steps in putting up and delivering the refrigerated packages:

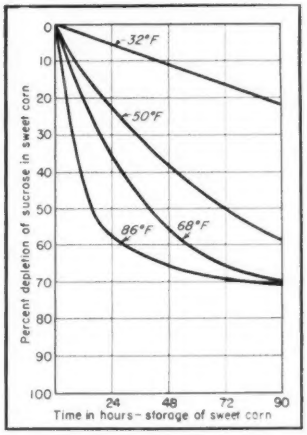
1. Delivery of field carts of vegetables to the prepackaging plant. Within 15 min. after harvesting, light farm tractors pull the carts from picking crews to unloading station.

2. Mechanically conveying the crops through cleaning, trimming, and sorting lines—and in the case of corn, through husking machines and rotary knives (for cutting to size).

3. Precooling the clean produce with chilled, 80 ppm. chlorinated water (at 33-37 deg. F.) for 13-15 min. This chilling bath brings the produce temperature to 40-42 deg. F.

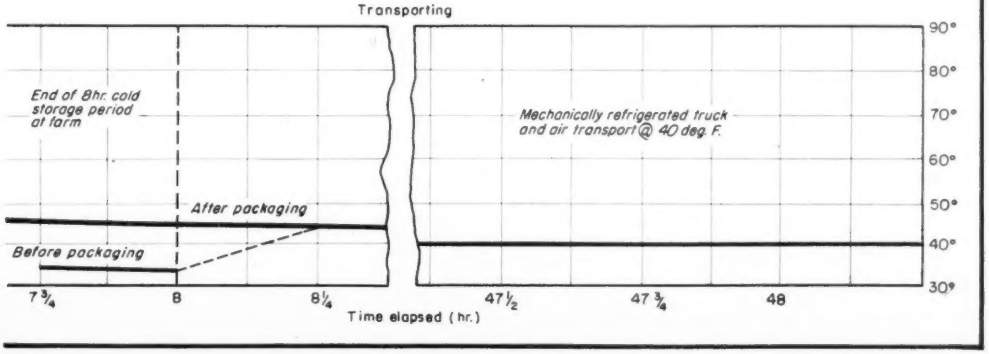
4. Further cooling of the vegetables held in open wire baskets in 30 deg. F. cold storage rooms. Several hours are required to bring the temperature down below the 40 deg. F. level recommended for greatest stability of the fresh vegetables.

5. Packaging in pulpwood trays, which are over-wrapped with cellophane and heat-sealed just prior to shipment. A Kliklock machine forms the trays, while Hayssen machines wrap. The individual packages are placed in master cartons which, for ventilation, contain 1-in. holes on the sides and incomplete closures on top and bottom.



DEPLETION of sucrose in sweet corn —temperature vs. time of storage.

Corn From Field to Receiving Dock



6. Shipping the vegetables—now only a few hours removed from the field—in mechanically refrigerated trucks. A special stacking pattern is used to permit complete air-circulation during transit.

What's Behind the Method

This system was derived from investigations conducted at Dickman by several government agencies, the University of Florida, and a number of industrial firms.*

These studies and subsequent commercial testing showed that the produce should not be packaged and cartoned before being placed in low-temperature storage. For without such precooling, the product will not chill as rapidly as desired due to the insulation qualities of the cellophane and pulpwood trays. Consequently, to insure quickest possible temperature reduction, this firm has stopped packaging prior to cold storage and switched to the system outlined above.

In the case of corn, it was found that quality depends largely upon the amount of sugar present in the kernels. And this sugar disappears very rapidly after harvesting of the corn—unless it is quickly cooled to a temperature between 32 deg. and 40 deg. F.

Wherever possible, mechanically refrigerated trailers are used to distribute the prepackaged vegetables from farm to market. By precooling both crops and trailers before shipment, and providing for proper air-circulation in transit, additional protection is guaranteed.

Trucking procedures were established after a series of tests in cooperation with the Department of Agriculture. Carefully checked were 25 typical truckloads—some refrigerated with ice and salt, the remainder mechanically, and all otherwise held constant.

Results indicated that the ice-and-salt units were unable to hold the prod-

(*Turn to page* 184)

* Schomer, H. A.; Showalter, R. K.; Hruschka, H. W.; Halsey, L. H.; Lieberman, M., *Prepackaging Sweet Corn at Production Area in Florida.* Florida Agricultural Experiment Station and USDA, May 1949.

MOLD-COUNT TRAINING SPEED: *Questioned and Defended*

NCA-Man Takes Issue on Time

Editor, FOOD ENGINEERING:

We have read with interest the article "Speed Your Mold Counts With This Handy Grid," by Paul L. Beach (page 112, Oct. 1951 FE). Some statements in the article indicate experience widely at variance with ours in training mold analysts at the National Canners Association Western Branch Laboratories over the past 25 years. We believe that publication of what we consider an over-optimistic account of the ease and speed of training mold counters may be misleading and we request a presentation of the following contrary view.

We believe that, excepting experienced mycologists, students should not be expected to learn to identify more than the commoner types of mold filaments found in tomato products in 1½ to 2 days. Distinguishing between obscure hyphae and certain other vegetable structures is much more difficult but no less important for accurate results.

The analysts we train are given intensive, personal instruction, at the rate of one experienced teacher to not more than about five students. Identification of individual structures under the microscope is checked field by field, and errors are discussed immediately. Under these conditions we have found (1) that most students reduce their errors to a few percent in about two weeks, (2) exceptionally good students may do satisfactory preliminary work after about one week, and (3) a few trainees are evidently not capable of accurate mold counting even after three or four weeks of instruction.

In our opinion, analysts who have shown their ability to find practically all the mold filaments in a sample and to refrain from counting as mold any other structures while in the school laboratory should still not be considered reliable analysts until they have had several months of practical experience and further checking.

The method described by Mr. Beach for locating fields on the Howard slide seems excellent, nevertheless, and we anticipate its helping us in our instruction.—*J. Russell Esty, Director, National Canners Assn., Research Laboratories, Berkeley 2, Calif.*

Author Holds System Substantiated

Editor, FOOD ENGINEERING:

The comments of Dr. J. Russell Esty (above) concerning the article, "Speeding Your Mold Counts with This Handy Grid," are appreciated by the author and received in the spirit in which they are given. However, the writer does not consider that the article necessarily represents an over-optimistic attitude toward mold counting. Seventeen years of intensive and extensive experience in the commercial testing and production of foods is basis for the article's remark: "Plenty of proved demonstration now lies behind the procedure, both in the successful teaching of beginners and in the retraining of veteran technicians."

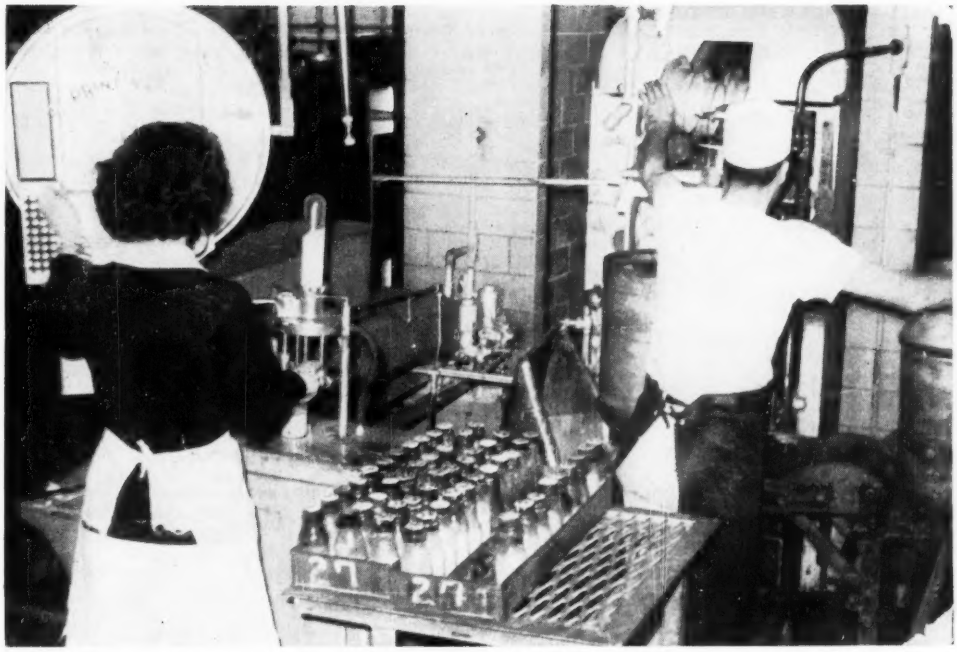
The article is pointed mainly toward the average or small canner. Why should such a packer undergo the expenses and time of two-weeks' training for personnel who will handle the control of tomato juice only?

We agree that there should not be more than five students per experienced teacher, and that intensive personal instruction should be given on the properties of mold and the actual technic of counting. Study of hystological slides is very important. And identification of individual structures—quadrant by quadrant for each field observed, with discussion of errors—is a must.

Plot an off-set grid coordinate to pre-select fields encountered, and you give the trainee a tool he can learn to use quickly and effectively. Using such a tool, the writer has never taken more than a week to train a beginner to count mold accurately and reasonably fast. Often the trainee learned all that was necessary within two days, and the remainder of the week was spent in gaining poise and speed. Such a training program calls for intensive "over the shoulder" instruction. The proof of any pudding is in the eating. And within the meaning and scope of the article in question, the reply of the author is that it's been done—many, many times.

Let the writer add one more point of importance: A laboratory technician in any endeavor should be checked from time to time, especially when he is "trained" and not "educated" in such work. After the newly trained mold counter is on his own at his home plant, the teacher should call upon him personally to make checks. If there be more than one counter in the plant, each should be instructed to check upon the technic of the other, until all observations are similar.

Lastly, daily check samples should be sent to a competent outside laboratory for testing and the results compared. Gross differences should then be investigated. The cross checking outlined above should be conducted regardless of the method or manner of the original training.—*Paul L. Beach, John H. Dulany & Son, Inc., Fruitland, Md.*



WHEN milk receiving steps are simplified and combined to reduce lost time and motion, great savings in labor bills result. In photo above, operators are using both hands for productive work, thus adding to their efficiency.

Plug Those $-Leaks by

Streamlining Receiving Operations

Work simplification strikingly increases receiving-room performance in Indiana dairies. Labor costs cut up to 50 percent by improvements based on state-wide studies of operations in 70 plants

CHARLES E. FRENCH

Assistant Professor, Agricultural Economics Dept., Purdue University, Lafayette, Ind.

Dairymen, are you getting maximum output from the labor in your milk receiving room?

If not, work simplification is advised as your solution.

■ **For with good arrangement of equipment and a straightaway can washer, one man can handle 65,000 to 85,000 lb. of milk per day. And two men 150,000 to 200,000 lb. In each case, the men will also have ample time for normal cleanup and setup.**

These capacities are substantiated by recent studies in the state of Indiana. Approximately 70 of the 380 dairy plants in the state were visited in an attempt to determine why milk receiving rooms in some plants were more efficiently operated than those in others.

The researcher observed what each plant had in the way of crew, equipment, and layout. Volume figures were compared. And related factors were checked. He was particularly alert in noting efficient arrangements and any unusual labor savers.

He then selected the 20 receiving rooms which he felt represented prevailing practices, and in these he tried work simplification.

The receiving job was broken down into very small parts. Each part, or element, was then time-studied. Motion studies were made to determine the good and the bad. Actual changes in installations were made to see if the efficient methods observed in one plant could be duplicated in other plants. Also, the good practices in each were isolated and "welded" into new methods completely different from any observed.

This approach was intended to reduce labor costs—and did.

■ **In one plant, the labor bill was cut in half. In another, a 3-man crew arrangement was changed so that operation could be by either one or**

MARKED SAVINGS WERE EFFECTED In Receiving-Room Costs When Work Simplification Methods Were Installed and Minor Equipment Changes Made

	Plant A	Plant B	
	When 1-Man Replaced 3-Man Crew	When 1-Man Replaced 3-Man Crew	When 2-Men Replaced 3-Man Crew
Actual cost of change	$50	$800	$800
Labor savings would pay for changes, to extent of	$14,856	$13,093	$7,544
Annual volume of milk, lb.	22,200,000	17,100,000	17,100,000
Annual volume needed to justify change, lb.	74,850	1,100,000	1,800,000
Time in which changes were paid for, days	6	106	186

two men, depending upon the circumstances.

Before we consider these improvements, however, let us look at some of the facts which spurred the researcher to make the actual work simplification changes.

He found that receiving workers spent 46 percent of their time receiving milk, but only 26 percent productively. Lost time (percent): 10 waiting for others; 4 inadequate equipment capacity; 4 malfunctioning machines, 2 miscellaneous. (For complete breakdown see drawings on following page.)

Some plants used eight to nine times as much receiving labor per can of milk as others. And the large plants were not necessarily the efficient ones—some small concerns were found to rate very high in performance.

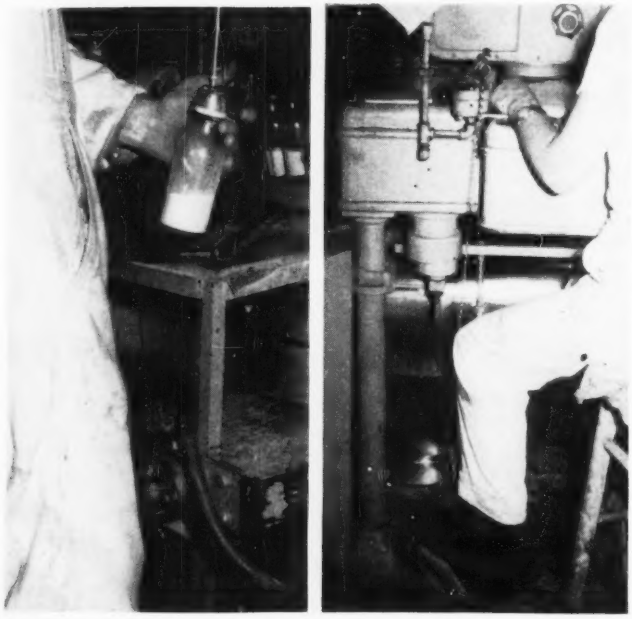
Two factors determine receiving efficiency—proportion of time wasted, and how well the working time is used.

Proportion of time wasted varied from 28 percent in one plant to 76 percent in another. Larger crews wasted more time than smaller ones. There was unused capacity so that many crews worked only when milk was arriving.

Equipment and labor were often out of balance. Some equipment was in poor repair. Labor load for different workers was unequal. Country trucks arrived erratically. Almost every receiving room had a limiting factor.

Working time per can varied, since some methods and equipment were more economical and effective than others. There appears to be a good and a poor method of dumping the can, taking samples, recording weights, grading, dumping the weigh tank, and combining operations. Type and capacity of equipment affected time consumed. Can washers and conveyors need special consideration.

Knee . . . **. . . and foot**



OFTEN work can be done with the knee (left) or foot (right) so the hands are released for other work. Such ideas often allow crew reductions.

How To Reduce Wasted Time

Here are a number of suggestions that will aid materially in increasing receiving room labor efficiency:

Use a small crew. Working time may be slightly more, but wasted time will be much less. The smaller crew is thus generally more efficient.

Do not build or maintain unused capacity. Capacity of crew and equipment should be adequate but not excessive. In most plants, one receiving line or receiving room is adequate. Two-man crews are almost always sufficient, and one man is often adequate.

Utilize non-operating period. Some plants studied saved several dollars on the labor bill by using the receiving crew for productive work when not receiving. A little planning and scheduling will pay off.

Balance equipment and labor. Equipment itself is usually fairly well balanced because capacities are known. The engineer does this as a matter of habit. But few managements have thought to balance labor input with equipment in the same way. One small plant studied could have reduced its labor force by two men simply by installing a small holding tank and coordinating equipment and men.

Keep equipment in repair. Minor equipment delays add up during the day. Nearly 5 percent of all receiving time went for these minor delays. Crew members in one plant wasted 15 percent of their time picking up can lids. In another plant 9 percent of receiving time was wasted because of makeshift use of a scrub brush as a conveyor can stop.

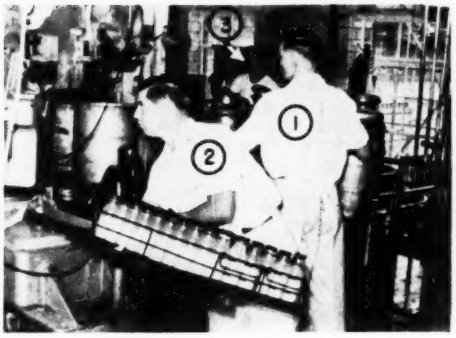
Distribute labor evenly among workers. It was common to find the dumper doing much more than his share of the work, the weight recorder doing much less.

Schedule country trucks. Managers usually threw up their hands at the thought of this. However, other industries do it and the reasons given for not doing it in dairy plants were far from convincing. Two scheduling systems were found in use. Results were promising.

Eliminate limiting factors. Almost every plant had a restrictive factor, such as a poor dumping method, a broken can stop, or an erratic pump. Varying from one plant to another, most of these factors were minor. But the waste they caused was excessive. The efficiency analysis very

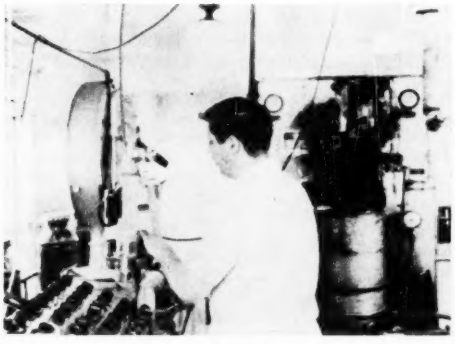
How Two Plants Cut Receiving Labor Costs

Plant A



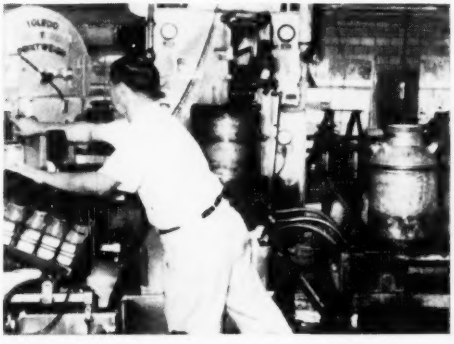
BEFORE

Dumper (1) rejected milk, dumped cans, helped change sample trays. Sampler (2) took samples, recorded weights, dumped weigh tank, changed trays. Grader (3) graded milk; tagged rejects, "cautions"; assisted fieldman.



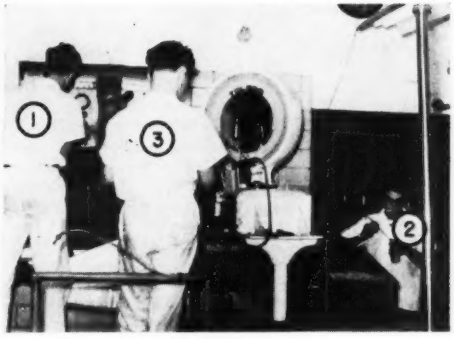
AFTER

With vacuum sampler, operator grades, rejects and dumps milk, records weights, takes samples, empties weigh tank, changes trays, makes special inspections, while . . .



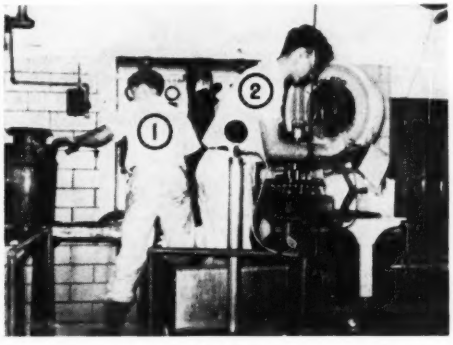
With hand sampling, operator performs all functions.

Plant B



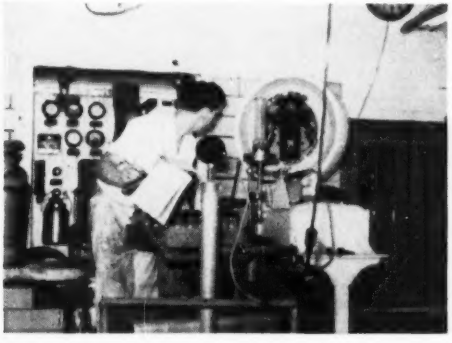
BEFORE

Dumper (1) graded and, when necessary, rejected milk, dumped cans and emptied weigh tank. Sampler (2) took samples and changed trays of bottles. Weight Recorder (3) entered weights and made special inspections.



AFTER

In flush season, dumper (1) grades, rejects, dumps cans and weigh tank. Weight recorder (2) enters weights, takes samples, changes trays, makes special inspections, and . . .



During slack season operator performs all of the steps.

naturally uncovered them. Often they can easily be eliminated. Check your own operation and you likely will find a weak spot.

Making the Most of Working Time

Following are a few operations that can be speeded up without difficulty:

Dumping the can. Here, time can be saved by allowing one can to drain while the lid is removed from the next one. This also gives better drainage of the can. Dumping with an arch and grid requires less time than with a bar. The force expended in dumping reaches unusual amounts under certain conditions. Much of this is eliminated with the arch.

Taking samples. Sampling by hand requires about the same amount of time as with automatic equipment. However, the automatic method may enable one man to dump, weigh, and sample; whereas, he may not be able to hand-sample under the same conditions.

If the automatic equipment enables you to make a compact work area so the crew can be reduced, it may be quite a labor saver. When hand sampling, the cup type dipper takes slightly less time than the automatic discharge type.

Arrange the sample bottles in a convenient location—as in a rack on the scale frame. Tilt them about 30 deg. at elbow level. Store them near the spot where sampling is done. Carry trays both ways when changing from cooler to sampling rack.

Recording weights. Actual recording of weights is quicker by most automatic equipment than by hand. However, in recording weights on permanent records, the manual method often takes less total labor. If high operating capacity is essential, the automatic equipment may be necessary. Some types of semiautomatic recording equipment take more time for actual recording than manual recording.

Labor may be saved with automatic equipment if it allows weight recording to be performed simultaneously with other work. Often this operation and sampling can be done at the same time by one person.

Weight cards should be fitted into a circular work area with the sampling equipment. They should be tilted about 15 deg. at the elbow level. The pencil should be prepositioned above the weight sheets.

Grading. When drivers loosen the lids, grading time is reduced one-fifth. From a labor-saving standpoint, the recommended practice is a combined dumping and grading operation. In this instance, additional labor savings may accrue by having the drivers loosen the lids.

Dumping weigh tank. The weigh tank should be dumped simultaneously with other work. Pneumatic cylinder dumps and automatic opening and closing valves facilitate this. A foot or knee pedal can often be used to free the hands of the operator for other work. Large valves should be used so the tank will drain rapidly.

Combining operations. Two or more operations should be combined where possible. Many crews can be reduced one man by having the dumper grade the milk. Grading by this method has been challenged by some dairymen. However, the fact that 14 of the 20 plants studied had combined these operations suggests that its practicability has been proved, at least to the satisfaction of some.

Sampling and weight recording should be combined in nearly all plants. With average pickup from the producer of 1½ cans or more, several arrangements will allow one man to sample and record weight with no delay for the dumper. If one man performs all operations, time required for sampling and weight recording directly affects operating capacity. Capacity required will thus determine the amount of automatic equipment to be used.

Can washers. Capacity of the can washer should be adjusted to crew capacity. Washer units in most plants studied were operating far in excess of this.

More time was used when receiving with a rotary washer than with a straightaway unit. However, type of washer does not necessarily determine labor efficiency. Good methods result in efficient operations with either under certain conditions.

Can conveyors. Conveyors should be kept in good repair. The working condition of any particular conveyor had more effect on labor use than did the type of conveyor. Chain wear must be watched on power conveyors. Connections between the sections cause most of the trouble on gravity conveyors.

What About Those Actual Changes?

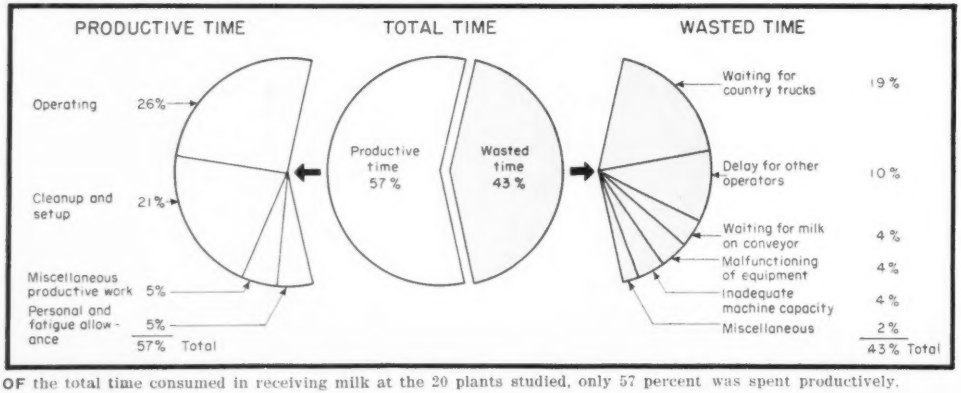
Some of the ideas discussed above were tried in two plants. Receiving labor costs were reduced one-third in one plant and one-fourth in another.

A 3-man crew in Plant A was reduced to one man by making minor changes in equipment. Actually, two new arrangements were tried. In one, samples were drawn by hand, and in the other they were drawn with a vacuum sampler. Results were essentially the same, both reducing labor costs by one-third.

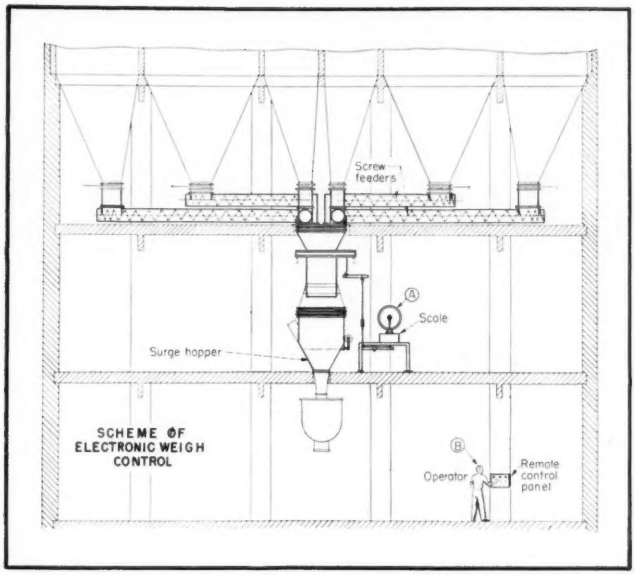
Equipment changes made: Rotation of the scale dial 45 deg.; installation of a small mirror so the scale dial could be read by the dumper; repair of a conveyor track with a 3-ft. length of track liner; slight enlargement of

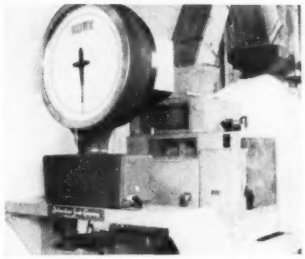
(*Turn to page* 160)

How Receiving Room Employees Spent Their Time

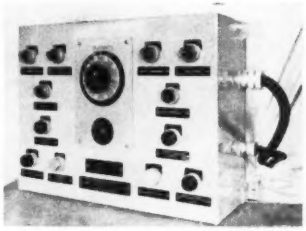


OF the total time consumed in receiving milk at the 20 plants studied, only 57 percent was spent productively.





SCALE (see "A", left)



PANEL (see "B", left)

Automatic, Cumulative, Consecutive Weighing System

Novel application of a simple servo-mechanism has made possible a system providing automatic, accurate, cumulative, and consecutive weighing of materials. And its potential uses are many in the food processing industry.

Known as Select-O-Weigh, it places advanced weighing methods within the range of even small plants by having a single automatic scale do all work that formerly required up to twelve separate scales. The system is stated to afford complete flexibility to cover formula variations in proportioning operations.

Heart of the assembly is a simple electronic circuit that has no arcing-contact and thus is highly adaptable for explosion-proof applications. A standard type of scale is used as the weighing element, with a pendulum dial scale acting as a force-measuring component.

Dial for Each Ingredient

A master control panel is built to include as many setting dials as there are ingredients to be handled in the specific operation. The maximum is twelve such dials covering as many ingredients.

The scale panel may be located (see sketch) in any part of the plant remote from the actual weighing operation. Here, the operator sets each dial on the control panel to correspond with proportionate amounts of each ingredient required in the formula. The weight selector on the panel is equipped with an adjustment vernier providing the necessary close control of materials flow. Sequence and timing in adding materials may be controlled selectively.

Button Initiates It

On pressing the "Start" button, the screw feeder mechanism is actuated, delivering to the scale the amount of material set on the first control dial and then stopping. This action is visible on the scale dial. Then, depending upon the setting of the various selections and controls, the scale discharges the material to a mixer and stops, or it receives the next ingredient and repeats the cycle, adding this second ingredient to the weigh hopper in the amount indicated by the second dial. Again, the pointer on the dial moves to its new position, as the material is added, and when the proper reading is reached the action stops.

Control circuits may be arranged to provide either (1) delivery of consecutive weights of varying amounts, according to a predetermined schedule; or (2) accumulation of a total batch of a pre-selected formula, with subsequent discharge to a surge hopper or mixer as a whole.

Provides Accurate Proportioning

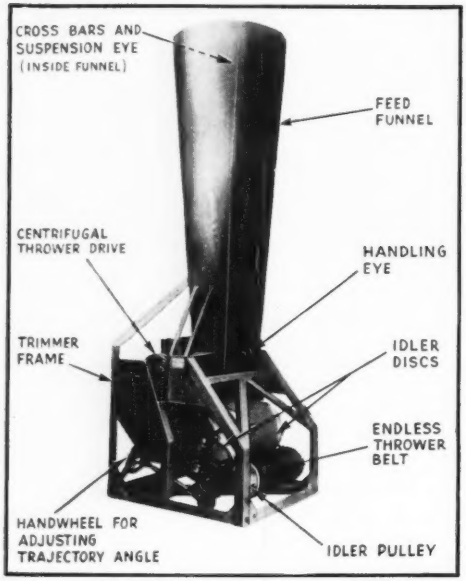
Weighing each ingredient separately in this manner assures a high degree of accuracy in the proportioned mix.

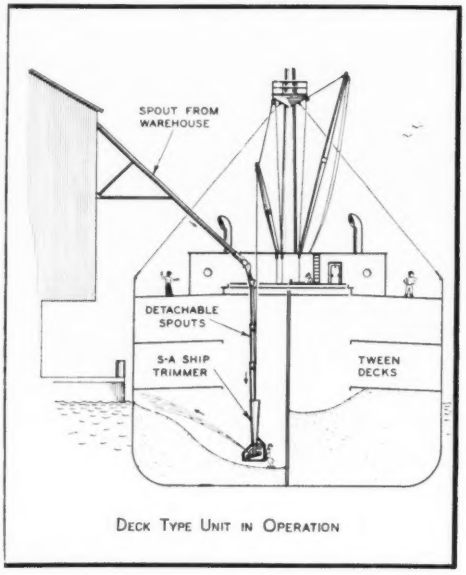
Following discharge of the automatic scale, a tare check circuit operates to prevent initiation of the next weighing unless all material is cleared from the weigh hopper and the unit is in perfect empty balance. This is accomplished by electrical verification of the re-positioning of the dial scale pointer at exact zero or empty position.

A further elaboration of the system is the use of repeater dials to indicate remotely the position of each scale pointer. These dials may be automatically or manually selective for any of the weighings, as desired by the operator.—*Richardson Scale Co., Clifton, N. J.*

Circle 103A on Reader Service Card

Trimmer Halves Time in Loading Bulk Materials





DECK TYPE UNIT IN OPERATION

Time of filling bulk materials into a ship's hold is reported cut 50 percent when this trimmer unit (photo) is employed. And labor requirements are minimized.

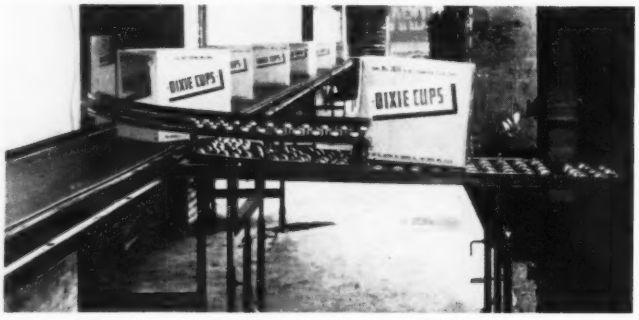
Capacity ranges up to 1,500 tons per hour, depending on type of material handled and size of trimmer belt.

Operating principle is simple. Idler disks keep a high-speed belt running in a concave path. Thus, materials fed in by chute hug the belt closely (through centrifugal force) and quickly attain the belt speed of 2,700-fpm. This velocity will "stream" most materials, a distance of over 50-ft. from trimmer. Variable belt widths and lengths are available for specific capacity requirements.

Trimmer is available in either a fixed type for permanent mounting on a vertical chute at dockside, or in a deck type, (photo and sketch) that is cable suspended from the ship's rigging. Fixed type has a mechanism for controlling unit from a panel outside hold. Suspended deck type must be steadied by men in hold. It can easily be spun through 360 deg. horizontally. And hand operated gear-mechanism regulates vertical angle of throw.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Circle 104A on Reader Service Card

Deflector Simplifies Loading Operation



Truck and car loading are made more nearly automatic with use of a new deflector. Only manual labor involved is in stacking cartons as they are automatically delivered to station.

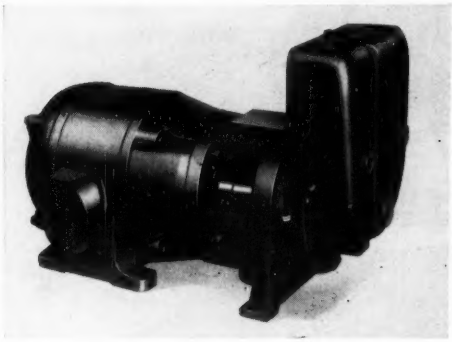
Deflector, attached to platform end of telescoping portable conveyor, automatically guides cartons off permanent belt conveyor and shunts them, at 90 deg. onto portable unit which extends into truck, trailer or box car.

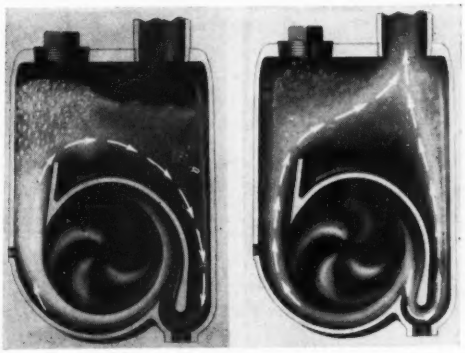
Both right and left hand deflectors are supplied.

Advantages claimed for complete car and truck loading system are: fully automatic operation to stacking point; no height adjustments needed when conveyors are shortened or extended; one man can set up system in few minutes, and equipment is readily mobile and can be used anywhere on loading platform.—*Wilkie Co.*, 5520 *Arch St., Philadelphia* 39.

Circle 104B on Reader Service Card

Self-Priming Pump Unaffected by Vapors





This new self-priming Motorpump is intended for applications under suction lift where it is necessary to eliminate appreciable volumes of air or vapor, and where prime is completely lost when such vapor is present, requiring filling of the suction line and casing before starting.

New pump recirculates liquid trapped in casing. Pump impeller discharges through two passages into a discharge chamber. During priming the upper passage discharges a mixture of vapor and liquid into the discharge chamber. Here, vapor separates from liquid and passes out discharge pipe.

Remaining liquid re-enters impeller through lower passage to mix with more vapor drawn in from suction pipe. This vapor is separated from liquid in same manner. When suction pipe is finally filled with liquid and pump is primed, flow through lower passage reverses and both passages act as normal pump discharges. During normal pump operation there are no recirculation losses and thus no need of valves to cut off recirculation. No flap valve is used because pump casing is so proportioned that sufficient liquid is trapped on shut-down to insure priming when unit is re-started.

Circle 105A on Reader Service Card

Pump is built in sizes from ¼ to 25 hp., with capacities up to 800 gpm, and a head up to 180 ft.

Standard models utilize cast iron casings with bronze impeller and are driven by Nema motors supplied by well-known manufacturers. Pumps are also available mounted on ball-bearing equipped cradles to be driven through a coupling by a motor or turbine.

Units range in overall size from 17⅜ x 14⅛ x 8¾ in. for smallest up to 35¼ x 25⅞ x 17½ in. for largest. Weight range is from 110 lb. to 625 lb. with motor.—*Ingersoll-Rand Co., 11 Broadway, New York City.*

Portable Stacker Is Speedily Elevated

Now in production is a new line of stackers and power boosters identified as the Universal Model 600-U Series. Units are designed for stacking, loading, or horizontal conveying of miscellaneous cartons, bags, or boxed materials.

Mounting (see photo) incorporates swivel caster base with floor-locking device. Trough is quickly elevated or positioned by means of a V-type frame controlled by acme screws turned by hand wheels conveniently located on side of trough.

Trough is constructed of 12-gage high-tensile steel and comes in 12, 14, and 16-ft. lengths. Rough-top belt can be furnished in widths of 12, 16, and 18 in.

Guard rails have an in-and-out adjustment of 6 in. to accommodate various size cartons, bags, or boxes.

Unit is powered by ¾-hp. reversible motor protectively mounted inside channel frame, yet accessible for servicing.

Belt speed is 54 fpm., maintained by spur gear reduction unit. Operating mechanism is equipped with Mechano seal ball bearings requiring no lubrication. Either 24-in. length roller feeders or power belt feeders are available as optional equipment. —*Industrial Engineering & Mfg. Co., Inc., Brimfield, Ind.*

Circle 105B on Reader Service Card

West Carrollton GENUINE VEGETABLE Parchment

Gives Good Protection, too!

Fine foods deserve the *best* flavor-protection that packaging can provide. That is why so many packers of moist foods use so much West Carrollton Genuine Vegetable Parchment, year after year—thereby winning quicker and more lasting public acceptance. This parchment is ODORLESS, TASTELESS, GREASE-RESISTANT, INSOLUBLE and is STRONG, too, wet or dry. We can print it for you in one or more attractive colors (special inks)—right to your specifications.

DRY WAXED PARCHMENT
BUTTER WRAPPERS
BUTTER TUB LINERS & CIRCLES
BUTTER BOX LINERS

★

LARD CARTON LINERS
MILK & ICE CREAM CAN TOPS
SLICED BACON WRAPPERS
FISH FILLET WRAPPERS & INSERTS

★

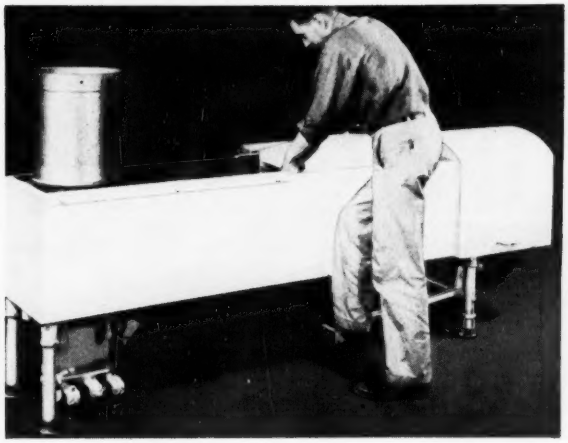
VEGETABLE SHORTENING CARTON LINERS
CELERY WRAPPERS
OLEOMARGARINE WRAPPERS
MEAT WRAPPERS

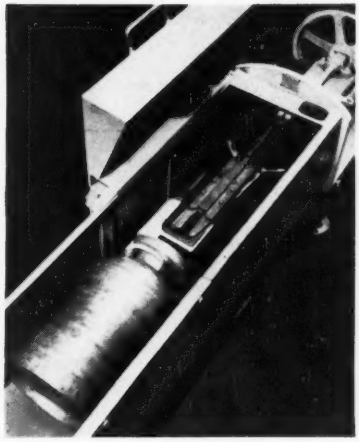
★

LINERS FOR MEAT TINS
POULTRY WRAPPERS
CHEESE WRAPPERS
TAMALE WRAPPERS
MANY OTHERS

WEST CARROLLTON PARCHMENT COMPANY • WEST CARROLLTON, OHIO

Rotary Scrubber Simplifies Can-Cleaning Task





Slow, laborious and time consuming hand scrubbing of extra dirty and heavily encrusted cans is eliminated with use of this rotating brush scrubber.

Dirty can is placed mouth down on pedestal (see illustration, left above). Here, can is pre-rinsed with hot or cold water at plant pressure when foot pedal (one of three directly beneath inverted can) is depressed by operator. Used pre-rinse water is caught in a separate compartment and drains to sewer. Pre-rinse treatment removes loose dirt from can to minimize contamination of wash tank water, and also softens heavy dirt to be removed by brushes.

Next, can is placed horizontally upon ruggedly constructed parallel grid guides in bottom of wash tank. This tank is filled with heated water to the overflow, charged with detergent. Can, is moved lengthwise so that expandable brushes (right above) are completely inside. Weight of can is entirely supported by roller racks.

Outside of can is scrubbed by a stationary bristle brush attached underneath wash tank cover lid. Counterweight on lid eases lifting. After can has been placed over expandable brush, lid is lowered so that brush bristles contact outside of can. A brush is also provided for scrubbing outside bottom of can.

With can in this position, motor which rotates inside brush mechanism may be started. Inside brush expands on a parallel plane inside can by means of pressure applied to a foot treadle. As brush expands it conforms to size and shape of can so that every inside surface is scrubbed thoroughly.

Release of pressure on treadle allows a heavy spring on inside brush assembly to retract expanded brushes. Operator is completely relieved of weight of can during scrubbing operation, since can is supported by roller rack.

When pressure applied to outside brush is greater than that applied to inside brush, can is held stationary and inside rotating brush scrubs inside surface. When pressure on inside brush exceeds that applied to outside brush, can rotates for scrubbing outside of can. This simple adjustment of relative pressure on treadle and on cover-lid handle regulates operation of inside and outside treatments.

After scrubbing, it may be again placed mouth down on pedestal and inside rinsed by either hot water, cold water, or steam from a jet nozzle in center of pedestal. Three foot-operated pedals are grouped for easy operation beneath tank. They are connected to push valves on steam and water lines and are so arranged that water, steam, or mixture of both may be applied.

As a safety feature, scrubber may be equipped with a "start-stop" switch, which protects operators, saves time, and eliminates manual operation of motor switch with wet hands.

Scrubber handles standard 40-qt. cans with rigid handles. With slight interchangeable modifications, unit will clean 40-qt. "drop handle" cans, 20 qt. milk cans, and round 10 and 20 qt. "squat type" ice cream cans.—*Rice & Adams Equipment Div., Pressed Steel Car Co., Inc., Buffalo 17, N. Y.*

Circle 107A on Reader Service Card

Speed, Accuracy Mark New Type Flow Meter

Fast and accurate response over a wide range is reported for a new type of flow meter having functional design. Low initial cost and maintenance are claimed for the new instrument.

Maker's engineers state that electronic integration is a feature of the instrument. It is available either as a mechanical flow meter with integral recorder, or as an electrical transmitter to be used with an inductance bridge receiver.

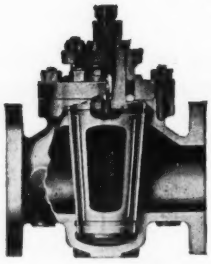
Meter is of the differential type, readily installed on a flow line. Body is mounted in a convenient location near the line, and the differential pressure lines from the orifice (or other primary element) are piped into standard ½ in. connections provided on the meter.

For electrical transmitting meters, a three-conductor cable is run between the meter body and the remotely mounted receiver. New meter is supplied in three ranges: 53, 119.25, and 212 in. of water, and for 750 and 1,500 psi. static pressure. For dry calibration, the three ranges are slightly greater.—*Minneapolis-Honeywell Regulator Co., Brown Instrument Div., 4502 Wayne Ave., Philadelphia.*

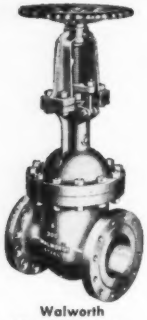
Circle 107B on Reader Service Card

● VALVES

● PIPE FITTINGS



Walworth
Lubricated Plug Valve



Walworth
Steel Gate Valve

Walworth
Iron Body Gate Valve

Walworth
"500 Brinell" Bronze Globe Valve

Walworth
Iron Body Saddle Gate Valve

Walworth
Cast Steel Flanged Fittings

Walworth manufactures a *complete line* of valves and pipe fittings: all made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties. In design, construction, and performance, Walworth products reflect more than a century of experience in the manufacture of quality valves and fittings.

Your Walworth distributor will give you full information on the *complete line* of Walworth steel, iron, and bronze, and special alloy valves and pipe fittings; also Walworth Lubricated Plug Valves, and Walseal* valves, fittings and flanges. Ask for this information today.

*Patented—Reg. U. S. Pat. Off.

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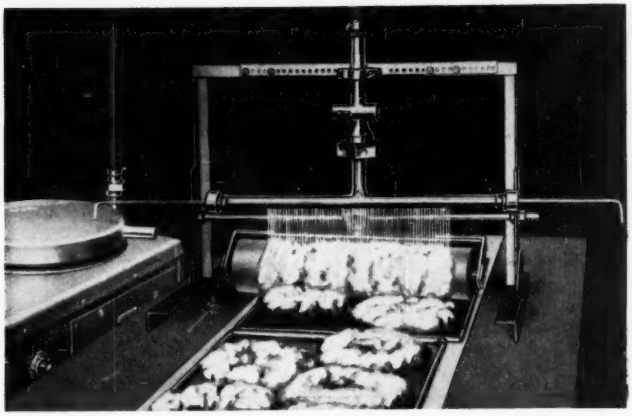
60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Mechanical Icing Device Gives Hand-Iced Look



Baked goods are stated to have a hand-iced appearance when the icing is applied by a new attachment on Frost-O-Fast icing machines. Further, labor and icing losses are reported cut.

The icing is applied on baked goods passing under a foam rubber roller that receives the material from a slotted automatic-feed head. The free-running roller adjusts itself laterally and follows the individual contour of any shape or size baked goods.

Icing is spread on high and low points without covering the filling, and with no dripping or icing loss. Pressure of the roller on baked goods is controlled by means of a counterweight. The width and amount of icing to be applied can be adjusted as required.

Sweet goods, coffee rings, and other baked goods up to 18 in., can be automatically handled by the unit, on or off baking pans, at the speed suiting the conveyor. As many as 60 coffee rings per minute, or 12 full pans can be run.

The frame of the unit is easily mounted and adjusted for conveyor width.—*Basic Food Sales Corp., Union City, N. J.*

Circle 109A on Reader Service Card

Cleaning Unit Uses Plant Steam

This special cleaner is designed to hook into existing plant lines, thereby utilizing steam generated for conventional plant purposes.

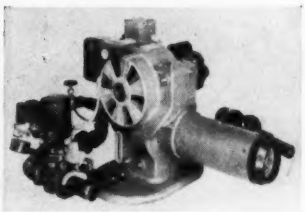
Known as the Kelite Fireless Steam Cleaner, it is a high-volume unit made in the two models affording capacities of 150 or 250 gal. per hour. With need for fuel lines eliminated, only two connections are necessary for operation of machine—one to steam source, another to an electrical outlet. A special caster-mounting (not pictured) facilitates movement of the compact unit to any work area.

Positive-action pump (110v. or 110-220v. a.c.) injects cleaning compound into steam line. In this way, dry steam is introduced into gun along with required amounts of cleaning compound. Patented Hy-Vel Nozzle concentrates cleaning blast within a small, well-defined area.

Standard equipment includes patented Aerated Gun Grips, which insulate steam gun and permit operator to work without gloves.—*Kelite Products, Inc., 1250 North Main St., Los Angeles 12.*

Circle 109B on Reader Service Card

Combination Burners Handle Gas or Oil



Reported is new line of five "Hev-E" combination burners accenting efficient use of gas or oil fuel.

Among advantages reported for new burners is a forced air draft system which provides a single blower fan for all air for combustion. Both gas and air are controlled to give high CO_2 with greatest efficiency.

Burners can be regulated to burn proper amount of gas or oil for requirements of particular installation. On all burners, low-fire start is accomplished with either gas or oil. On two larger sizes, the AMG-5 and AMG-7, full modulation between high and low fire is available.

Modern type electronic controls are used so that main gas valve cannot be opened unless a pilot flame is established. These same controls are those already proven in burning of oil. Changeover from gas to oil on all models is quickly accomplished.

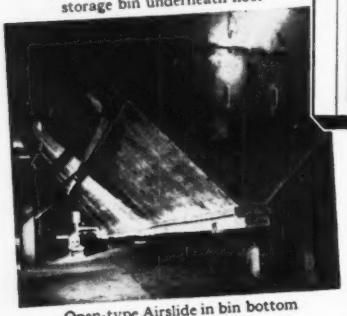
Models range from 720,000 max. Btu. gas burned in the AMG-2 size to 8,700,000 max. Btu gas burned in the AMG-7 size.—*Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.*

Circle 109C on Reader Service Card

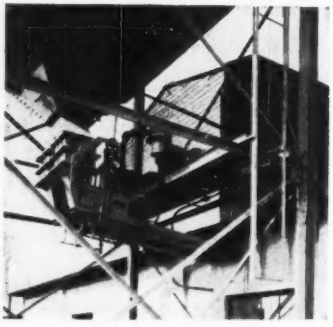
Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

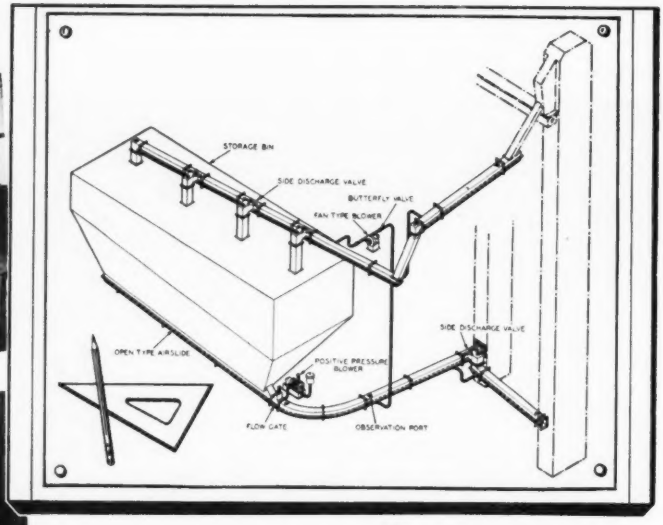
Conveying from elevator to storage bin underneath floor



Open-type Airslide in bin bottom conveying to elevator



Conveying from storage bin to weigh scales in plant



F-H AIRSLIDE® CONVEYOR you profit by

STARTING FROM SCRATCH

While your modernization program is in the planning stage, get **ALL** the facts about pneumatic conveying of fine, pulverized, and granular materials. Pneumatic conveyors permit economy and convenience in location of buildings and production equipment without the restrictions or straight-line limitations of mechanical conveyors. You'll save time, trouble, and money by pre-planning before installation of your conveying system.

Each job is unique. Each job requires individual study, an individual recommendation of the system best adapted to the purpose. Only specialists in the engineering and building of pneumatic conveying systems are fully equipped to make such recommendations.

Fuller is an organization of specialists in pneumatic conveying systems, and manufactures four basic types of conveyors, each designed to do a particular job in the most efficient and economical manner.

That's why we urge you to avoid possibly wasteful preliminary engineering—why we suggest you let us study your requirements and submit our recommendations, proposal drawings and estimates *before* you start construction. There is, of course, no obligation whatsoever.

Illustrated is the F-H Airslide, one of the four types of conveying systems we manufacture. It is a revolutionary conveyor, using low-pressure air which fluidizes fine, dry materials so that they flow—by gravity—like water. There are no moving parts—nothing moves but the material.

FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS • COMPRESSORS AND VACUUM PUMPS • FEEDERS, AND ASSOCIATED EQUIPMENT

FH-23

High-Speed Mixer Does Fast, Thorough Job

Speedy emulsification, dispersion, and intimate mixing are claimed benefits of a new mixing device.

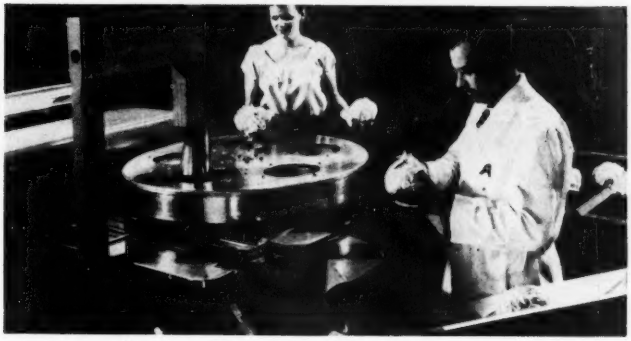
Known as the Simplex Dispersator, the unit is stated to produce maximum turbulence and contact between various products, whether they are liquid-liquid, liquid-solid, or liquid-gas. Tests, according to maker, have demonstrated that unit achieves satisfactory results in fraction of time needed for other types of high-speed agitators or mixers.

Unit is reported to have been proved out in: Building up of emulsions and dispersions, acceleration of chemical reactions, prevention of settling out, speed-up in preparation of solution, and many processes involving intimate mixing and agitation.

The mixer consists of a cylinder that rotates at high speed. Centrifugal force sends the product outward through narrow slots in the wall of the cylinder under considerable pressure. Effect is termed two-fold: First, the product is sheared at high speed as it passes hrough the slots; second, the columns of liquid emerging from the slots are further sheared in coming into contact with the slower moving mass of liquid in the mixing vessel. Illustration shows a laboratory mixer. Unit can also be supplied with flexible shaft drives.—*Premier Mill Corp., 218 Genesee St., Geneva, N. Y.*

Circle 113A on Reader Service Card

Unit Contour-Wraps 30 Heads Per Minute



This new machine wraps, to contour, lettuce and other irregular-shaped produce items in Lumarith acetate film. Production rate for unit, run by single operator, is 25-30 items per min.

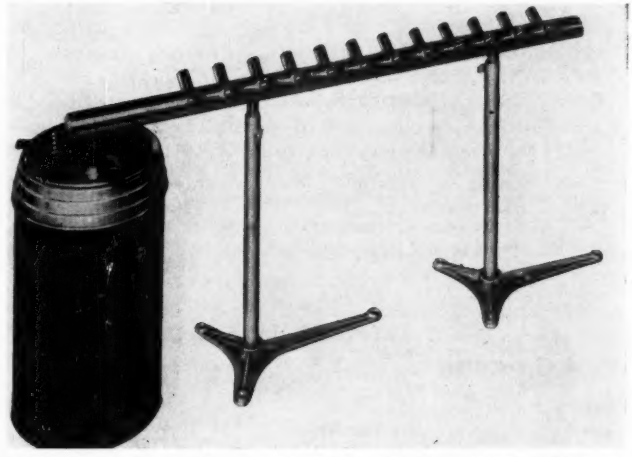
Powered by a ¾ hp. motor, the machine produces a heat-sealed transparent wrap which protects the lettuce against shrinkage and spoilage while providing full product visibility.

Teamed with acetate film, machine helps solve many problems which have plagued lettuce retailers. Shrinkage loss is reported minimized. Slime and mold, two other lettuce enemies, are avoided because acetate's gas-permeability permits waste gases to escape.

Unit works in the following manner. Roll stock film is threaded through a feed roll to a device which cuts it to desired size. Meanwhile, the operator feeds trimmed lettuce heads into a five-hole revolving turrent. A plunger descends on the lettuce and pushes it into the film which forms around it as a tight-contour wrap. Cutting and sealing jaws sever the excess film and heat-seal the wrap, making a tab-style seal. —*Triangle Package Machinery Co., 6659 W. Diversey Ave., Chicago 35.*

Circle 113B on Reader Service Card

Freeze-Drying Unit for Laboratories



CULTURES, and other products in small volume can be dried in this Model 3 freeze-drying unit, a small, economical piece of equipment for general research and laboratory work. Unit will handle up to 24 containers simultaneously. It consists of a tank and chrome-plated manifold with 24 outlets, and a vacuum-insulated bath. *F. J. Stokes Machine Co., 5500 Tabor Road, Philadelphia 20.*

Circle 113C on Reader Service Card

Faster delivery for Fox Frozen Foods

...by WHITE 3000

FROZEN FOOD transport calls for *all* the advantages of modern truck design . . . that's why Fox Deluxe Foods, Inc., keeps three White 3000's in steady service on their Springdale-Chicago run.

Dependability, yes. Constant trip-time, too, means a great deal. Consistently low operating cost and fuel economy are important. And maximum payload is a must—extra carrying capacity means savings in transportation costs.

All these are proved advantages of the White 3000 in frozen food transport service. Ask your White Representative for facts.

READY TO SERVE Next Day!

FOX DELUXE quick-frozen frying chickens travel by White 3000 from Springdale, Ark., to Chicago . . . 28,000 lbs. per trip . . . ready for sale in Chicago retail outlets in 20 hours. The extra-capacity trailer made possible by White 3000 design is filled with chicken-feed on return trip.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio

White Emergency Service Corps
Keep Your Whites In Best Working Condition

Tips its cab to service

For more than 50 years the greatest name in trucks

One-Knob Controller Adjusts Two Responses

Recently introduced is a new, non-indicating, force-balance controller with only one-knob adjustment for two control responses.

Called the Transet Bi-Act controller, it is designed to transmit a measured variable to some remote location. Unit is particularly adaptable to flow, liquid level, or pressure applications requiring fast reset rates and broad throttling bands, or where derivative action is not essential. New unit fills role as a component in the maker's three-part system—controller, transmitters, and miniature recorder for graphic panel installations.

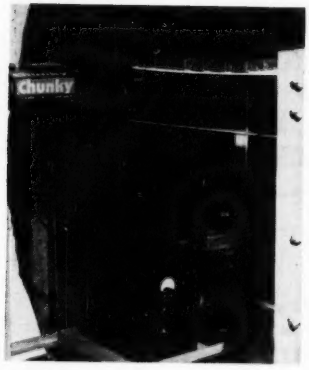
Incorporated are six features designed to make the controller especially advantageous to many applications. They are:

(1) A new and simplified regulating circuit that pneumatically links proportional and automatic reset responses. (2) One knob to adjust both proportional and automatic reset responses so processes easily can be brought to a stable condition. (3) Controller action that can be changed quickly and easily without disturbing any piping connections. (4) An optional, plug-in type, leakless manifold providing a simple means for connecting or removing controller. (5) Rapid controller action obtained by a large capacity booster air relay. (6) Built-in cut-off relay so that controllers may be either panel or field mounted.

Controller measures 7½ in. overall, has a range of adjustment of 1 to 200 percent throttling range, and automatic reset of 0 to 100 repeats per minute. It is available with or without manifold bracket.—*Taylor Instrument Cos., Rochester 1, N. Y.*

Circle 113A on Reader Service Card

Metal Detector Does Speedy, Thorough Job



Efficient accelerated spotting of metallic particles in food products is reported with this new, small-aperture inspection head detection equipment.

Designated the "Guardsman Series," new detectors are stated to indicate presence of even minute particles of metals or alloys, whether magnetic or non-magnetic, and regardless of their depth in the material, as products pass through an inspection aperture on a conveyor belt or chute at rates of 10 to 1,000 ft. per min.

They can be used to light a warning lamp, ring a bell, stop a process, mark the contaminated object, or deflect it into a special channel or receptacle for rejects.

Detectors consist of two units. The control unit, which is the same for all models and applications, measures 8¼ in. high, 6¾ in. wide, and 10 in. deep. It weighs 20 lb. Second unit, the inspection head, is provided in four different styles to meet specialized installation requirements.

Two of box-type heads have rectangular apertures—one measuring 2½ x 7½ in. (Model MI-33432) and one 4 x 5 in. (Model MI-33434). These are designed for detecting metal in candy, chewing gum, and other items that can be carried on a small conveyor belt during processing.

Others have smaller box-shaped heads with round apertures—one (Model MI-33441) of $1\frac{1}{8}$ in. dia., the other (Model MI-33442) of 2 in. dia. These are suitable for ground meat, liquids carried in glass tubes, and similar items that can pass through the small head in a non-metallic tube or trough.

Materials passing through inspection aperture are screened by a high-frequency electromagnetic field, generated by coils embedded in a water-proof material. High-frequency power is fed to coils from a self-contained electronic oscillator, and reaction caused when metal is present in material being screened operates a relay which triggers either a signaling device (lamp or bell) or an automatic marking or ejecting mechanism, or combination of these, whichever is desired.

Equipment is stated to be immune from building and conveyor vibration, while electronic voltage regulation assures freedom from effects of line voltage fluctuations. Equipment is not affected by normal humidity and temperature changes. Sealed against dirt, lint, and dust, unit is also water-proof, permitting scrubbing and hosing where required.

All models have a power requirement of 115v. 50, 60 cycle, 70w. a.c. Equipment is termed flexible and simple to install. Unit illustrated is in operation in plant of Chunky Chocolates Corp., New York.—*Eriez Mfg. Co., Erie, Pa.*

Circle 113B on Reader Service Card

Belt Damage Avoided By Carrier Unit

Edge wear of belt is reported negligible with this carrier, and its use is said to insure against any possibility of serious belt damage due to improper training.

With new unit, states maker, most applications need only be installed at intervals of 50 to 100 ft. The "training rollers" are described as responding instantly to any shift of belt off dead center, tilting carrier into an angular position with respect to direction of belt travel. This quickly returns belt to center, and carrier resumes its normal position.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Circle 113C on Reader Service Card

An important message for users of filter aids:

JM

Johns-Manville Announces a 40% increase in Celite* production

AT A TIME when many vital materials are in short supply, Johns-Manville is pleased to announce that the culmination of two-and-one-half years of planning, designing and construction has resulted in a 40% increase in the production of its diatomite filter aids.

Carefully processed from a huge and exceptionally pure deposit of diatomaceous silica, Celite products will continue to meet the strict standards of quality established by Johns-Manville in the past.

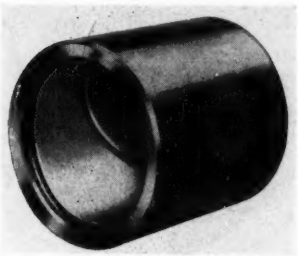
We sincerely appreciate the co-operation of all our customers during the period when the supply of Celite was limited. And we pledge ourselves to co-ordinate our own plans for future expansion with your requirements so that Celite will always be available when needed.

For further information about Celite and its availability for your process, write Johns-Manville, Box 290, New York 16, N. Y.

*Reg. U. S. Pat. Off.

Johns-Manville CELITE FILTER AIDS

Nylon-Lined Bearings for Quiet, Smooth Operation



Dampening of mechanical vibration and smooth quiet operation is reported with use of "Nylined" bearings.

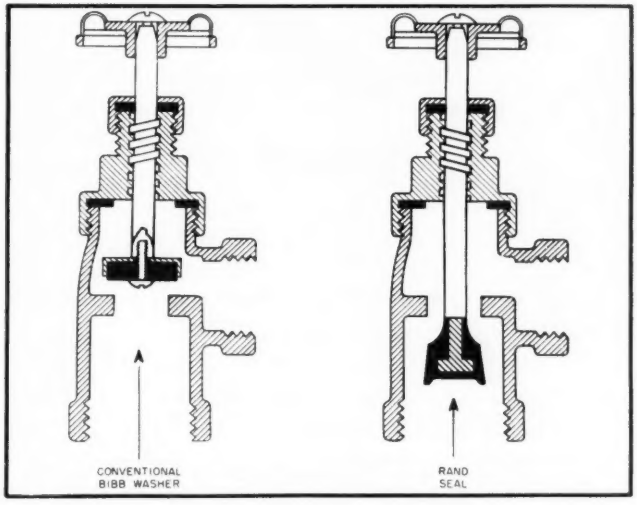
A typical bearing (photo) consists of an outer sleeve of inexpensive metal and a relatively thin lining of Nylon material. Nylon is stated to perform exceptionally well even under adverse lubricating conditions, or with no lubricant at all. It can stand temperatures in excess of 250 deg. F. and is unaffected by most ordinary industrial chemicals. Tough glazed surface which develops on Nylon results in extremely low friction coefficients with a comparable low rate of wear.

Nylon liner is retained in outer sleeve in a manner which will permit it to expand and contract circumferentially around the inner periphery of outer sleeve. Liner is provided with a narrow slot, or compensation gap, which interrupts the circumference. In applications where lubricants can be used, one or more annular grooves are provided on inside of outer sleeve to form storage wells for grease or other lubricants and evenly distribute them.

Nylined principle is stated to eliminate need for wide clearances necessary in plain Nylon bearings, to compensate for dimensional changes due to thermal expansion and moisture absorption. Maker says dimensional changes in liner are taken up by compensation gap with no appreciable effect on diameter.—*Thomson Industries, Inc., Manhasset, N. Y.*

Circle 115A on Reader Service Card

Valve Works With (Not Against) Fluid Flow



Innovation in valve design, the Rand Seal diagrammed here operates on a new principle, the seal stated to make possible a valve that is leak-proof, long wearing and easier operating.

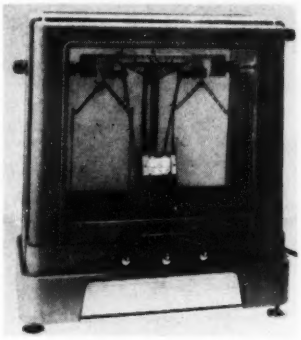
Essentially, seal works with, rather than against, the fluid flow. The cone-shaped seal is closed in same direction as the movement of liquid, allowing high or low pressure to seal valve. Leak-inducing permanent deformation, due to compression of a resilient member against a non-resilient seat, is reported eliminated.

Cup-shaped conical washer of seal incorporates an imbedded metal plug that eliminates bending and warping and makes seal leak-proof. If contaminants in fluid (such as sand or grit) are not pushed ahead of one sealing line contact, conical shape of seal provides establishment of a new line contact without damage to bore. Rubber member of seal is specially compounded to withstand oil, grease, steam, water, and most of the industrial chemicals encountered.

Unit is adaptable to many present designs of valves and other devices for control of fluid and gas flow.—*Rodic Chemical & Rubber Corp., Allen Ave., New Brunswick, N. J.*

Circle 115B on Reader Service Card

Double Pan Balance Speeds Weighing



This new balance has been designed for fast, repetitive weighing.

Known as the "Projectomatic" Model AB-1, it is suited for regular laboratory work, and is stated to be the only balance of this type with double pans for making taring (compensating for container weight) possible.

Projection is accomplished through a new optical system that produces a clear, sharp image on a screen specially positioned for readability. A lamp behind the heat-insulated back panel is projected through a transparent micro scale. Light is automatically switched on and off as the beam is released and arrested.

Automatic dampers at each end of beam arrests oscillation quickly, further speeding a positive reading.—*Christian Becker Div., Torsion Balance Co., Clifton, N. J.*

Circle 115C on Reader Service Card

MOLD CAN BE RETARDED

...with tailor-made Riegel papers

THE HUNDREDS of different fungi and molds that affect baked goods, drugs, foods and textiles are a serious problem in functional packaging. To combat this, Riegel has perfected an anti-mold treatment . . . an odorless chemical in the paper that gradually permeates the package with an anti-mycotic vapor. It's just one of *many* technical features Riegel can build into packaging papers. The list at left shows a few more. Every product requires a different combination of these features. A simple waxed paper might do for one. Another might require polyethylene-coated glassine . . . or a triplex lamination of foil and special glassines. Whatever you need, Riegel can usually tailor-make the right paper . . . quickly, efficiently, economically. Just tell us what you want paper to do for you. *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

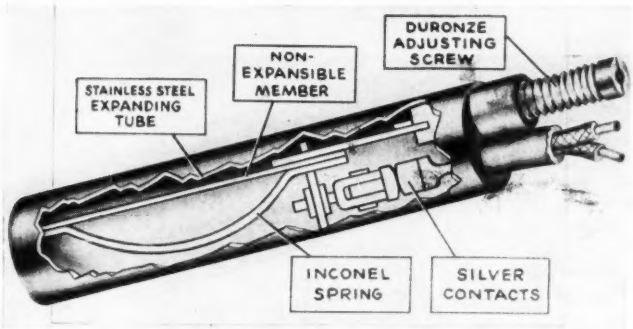
A few things RIEGEL can do for you . . .

- **Keep products dry**
- **Keep products moist**
- **Retard rancidity**
- **Retard mold**
- **Seal with heat or glue**
- **Provide wet strength**
- **Stop grease penetration**
- **Retain aromas, flavors**
- **Resist extreme cold**
- **Reduce breakage**
- **Prevent sifting**
- **Protect from light**
- **Resist alkalis**
- **Resist corrosion**
- **Boost machine efficiency**

Riegel FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

▶ WRITE FOR SAMPLE BOOK

Expanding Tube Thermostat Has New Features



Many difficulties termed characteristic of expanding tube thermostats are reported eliminated by an entirely new design.

The new Scaico model utilizes a stainless steel tube as the expanding member and an Invar strip as the non-expanding member. An Inconel spring gives fast make-break action.

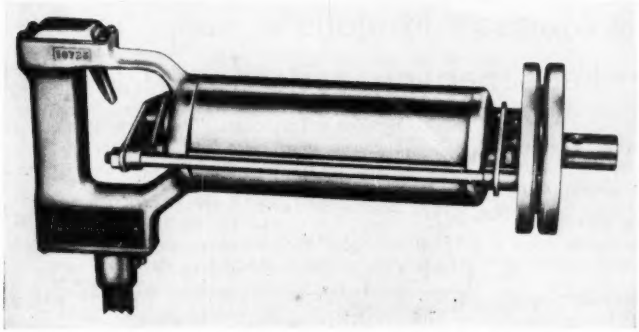
A Duronze adjusting screw permits quick and easy setting of control point at any temperature up to 600 deg. F., and no elaborate heating or cooling procedure is required to stabilize it. Pulling or flexing leads doesn't affect contact position and leads may be conveniently replaced if necessary. Leads of any desired length are supplied. Silver contacts provide two breaks in series, for long maintenance-free life.

Thermostats are made in three types for conduction, convection or immersion. Series 12 is ½ in. in dia., 2-3/32 in. long for 600w. loads at 110v., or 230v., ac or dc. Sensitivity is .2 deg. F. on 1 amp. load.

Series 58 is ⅝ in. dia., 3 in. long for 1,000w. loads at 110 or 230v. ac. or dc. Sensitivity is 1 deg. F. on 1 amp. load.—*Smith Control & Instrument Corp., Palmyra, N. J.*

Circle 117A on Reader Service Card

Masonry Drill Speeds Maintenance Jobs



For faster, easier drilling of holes in concrete, brick and stone—as required in plant maintenance work and in the installation of machinery or in hanging heavy pipes and ducts—there is now being marketed a new electromagnetic hammer drill.

Designated Model No. 17-RO, the hammer has a 1⅛-in. drilling capacity, weighs 21½ lb., and operates on 110v. or 220v.

Automatic rotation of the carbide-tipped, spiral-fluted drill is stated to speed up hole drilling, eliminate manual turning of the drill chuck, and reduce fatigue. Recoil actuates tool through rubber ratchet mechanism.—*Syntron Co., Homer City, Pa.*

Circle 117B on Reader Service Card

New Metallizing Guns Are Semi-Automatic

Two new metallizing guns—Type 4E for machine element work, and Type 5E for corrosion protection coatings—are stated to develop extremely high spraying speeds in hand-held operation.

New units are reported to come very close to automatic operation. They incorporate a patented jet siphon principle in the gas head to automatically compensate for variations in gas pressure as high as 10 lb. This is stated to provide a steady, unvarying flame producing uniform coatings at low cost. Guns also incorporate automatic control of wire feed to compensate for kinks in wire and reel stand drag.

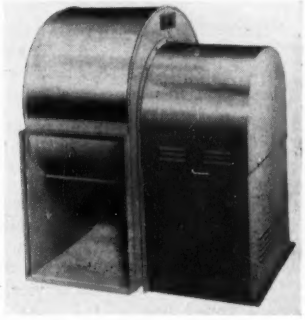
Type 4E gun is designed to spray all wires from 20 B&S gage to ⅛-in. in any metal—carbon steels, stainless, Monels, bronze—at very high speeds. Maker contends it will thus bring considerable savings by cutting machine part repair and salvage costs.

Type 5E is specifically designed for speedy spraying of softer metals, such as zinc and aluminum, for long-period protection of equipment and structures against corrosion. The 5E sprays ⅛-in. wire and is reported to deposit as much as 55 lb. of zinc per hour, aluminum 15 lb. per hr.

Guns may be mounted for use on a lathe or other machine in production line work, or may be used in hand-held operation. They weigh 4 lb., 12 oz.—*Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1.*

Circle 117C on Reader Service Card

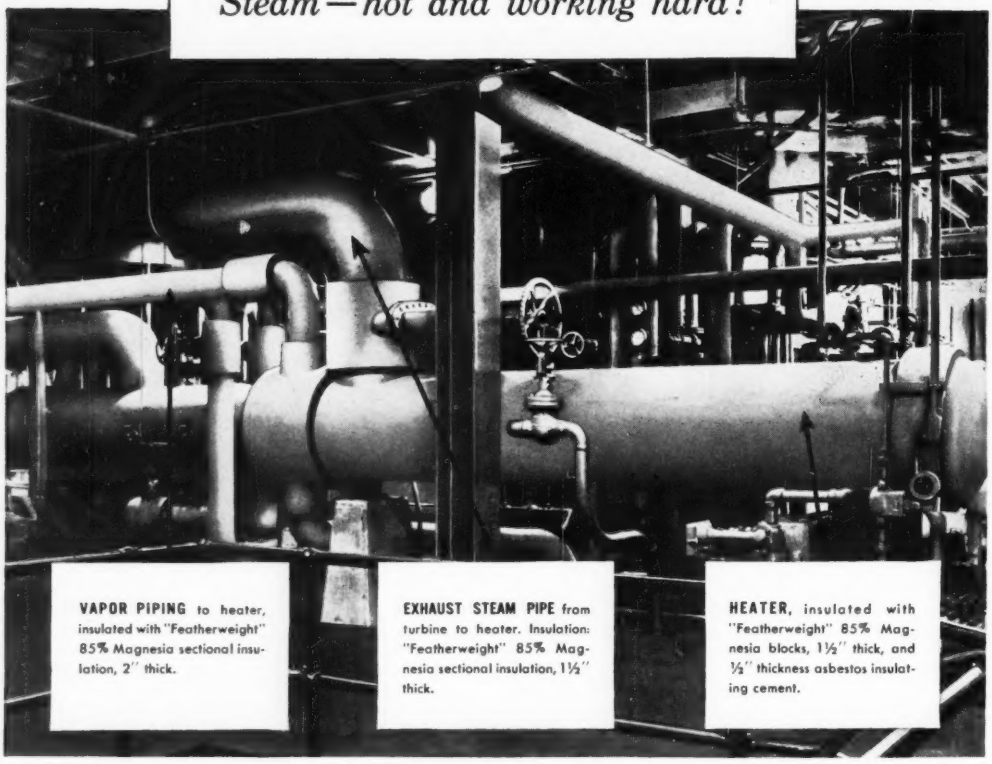
For Outside Use



WEATHERPROOF hood over motor drive section of this new centrifugal fan set-up permits outside installation without any further protective enclosure.—*The Trane Co., La Crosse, Wis.*

Circle 117D on Reader Service Card

Steam—hot and working hard!


VAPOR PIPING to heater, insulated with "Featherweight" 85% Magnesia sectional insulation, 2" thick.
EXHAUST STEAM PIPE from turbine to heater. Insulation: "Featherweight" 85% Magnesia sectional insulation, 1½" thick.
HEATER, insulated with "Featherweight" 85% Magnesia blocks, 1½" thick, and ½" thickness asbestos insulating cement.

These Keasbey & Mattison Insulations keep heat on the job—keep heating costs down!

Steam is expensive to produce . . . and far too valuable to waste. That's why "Featherweight"® 85% Magnesia was the insulation used in this large Southwestern utility plant.

"Featherweight" 85% Magnesia gives maximum protection against heat loss—keeps steam "on the job" wherever and whenever it's wanted!

This is but one of thousands of installations of "Featherweight" 85% Magnesia Insulation—on ships, in power plants, in the chemical process and food industries. With a background of more than 60 years' service, "Featherweight" is today one of the most widely used and favorably accepted insulations for temperatures up to 600° F. When used in combination with K&M Hy-Temp Insulation, "Featherweight" 85% Magnesia is efficient and practical for temperatures up to 1900° F.

Ask your distributor, who is also an experienced applicator, for complete information on "Featherweight" 85% Magnesia, or any insulations in the complete K&M line. Or, write us.

The newest development in thermal insulation: "KaytherM" High Temperature Blocks

A product of years of research and development! "KaytherM" provides maximum efficiency up to 1500° F. It is molded to size . . . incombustible . . . insoluble in water . . . has exceptional strength and high dimensional stability . . . is light in weight . . . easy to handle . . . quickly applied. Available in flat blocks 6" x 36"; in thicknesses of 1", 1½", and 2".

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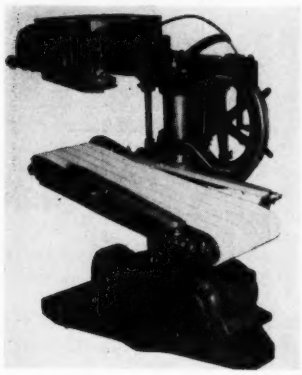
COMPANY • AMBLER • PENNSYLVANIA

Nature made Asbestos . . .
Keasbey & Mattison has made it serve mankind since 1873

K&M best in asbestos®

Automatic Bag Closer Has High Capacity



This completely automatic machine is reported capable of closing up to 2,000 paper bags per hour.

Machine is designed for low-cost, mass production packaging of bags weighing from 2 to 100-lb. when filled.

Unique arrangement of chain drives compresses neck of bag, then seals it with 12, 14 or 15-gage metal wire. Unit is powered by a ½ or 1-hp. electric motor (optional).

Bags tied by the machine, maker states, are neat, uniform, and will not break open under even repeated jolts in shipment. Potatoes, feeds, grains are reported packaged with equal ease, and even powder-fine materials cannot seep through the ring-sealed top.

Stated to be highly flexible, unit can be added to existing facilities or easily adapted to a wide variety of individually engineered conveyor installations. Standard conveyor, which carries bags to tying mechanisms, is 41 in. long, 9 in. wide. It can be raised vertically from a point 19 in. above floor to a maximum height of 30 in. Other sized conveyor and belt feeder installations can be built to individual specifications.

Five new models, each designed for bags within specific capacity ranges, are now in production.—*Hamer Machine Co., Minneapolis, Minn.*

Circle 119A on Reader Service Card

New Chemicals

Additive-Type Compound Aids in Bottle Washing

Film-free, sparkling-clean bottles are reported with use of a new additive-type compound.

Called Sequet, it is employed in conjunction with alkaline bottle-washing solutions to increase their cleaning action. Combining water sequestering chemicals and synthetic wetting agents in balanced ratios, it is designed to reduce cost of bottle-washing operations.

Compound is stated to eliminate smoky, cloudy, or "blue" bottles through its quick penetration and removal of such soils as syrup deposits, sugar residues, yeast mold, oil and grease contamination, and paper and foil labels.

Material is also recommended for cleaning beverage-processing and handling equipment, and for conditioning water in beer pasteurizers. It is stated to retard clogging of spray nozzles, reduce rusting and corrosion, and speed draining and drying of bottles discharged from pasteurizer.

Amount of compound required in any instance depends primarily upon water-hardness conditions. Generally, a maximum of 1 percent compound is added for each grain of water hardness, based on quantity of alkali needed to charge washer at desired strength. Material is packed in 300-lb. and 125-lb. containers.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Circle 119B on Reader Service Card

Dip Protects Wood Against Dry Rot

Announced is a new member of "Fungus-Ban" family, a copper naphthanate dip for wood equipment that frequently is exposed to water. It gives primary protection against dry rot. A green color is imparted to the wood, thus indicating it has been treated.

Of non-crystallizing nature, the preservative is made to meet Federal Specifications MIL-W-906 Type 1 or Class A. It can be painted over with ship-bottom or normal paint after 24-hr. drying.—*The Wilbur & Williams Co., 130 Lincoln St., Boston 35.*

Circle 119C on Reader Service Card

Less Oilings Required With Tacky Lubricant

A new general machinery oil is reported having the unique feature of metal adhesivesness. It is tacky, thus clings to the moving parts.

Known as Kling-Oil, it is stated to "stay" longer than conventional lubricants and thereby the number of oilings required is reduced—often by several times, according to the maker. Further, its use is said to promote safer and cleaner shop conditions since there is less drippage and spattering.

Tacky property of the oil is not affected by rubbing action of machinery. No gumming or build-up is experienced after continued use. Oil has an SAE-30 viscosity and may be used anywhere similar oils are employed. It is applied by same methods. Maker says that where lubricant is applied by circulating system, Kling-Oil may be used satisfactorily, but no advantage should be expected.—*Magnus Chemical Co., Inc., Garwood, N. J.*

Circle 119D on Reader Service Card

New Protective Coating Guards Against Oils

Coal tar pitch is now being compounded into a fast-drying protective coating by breaking it down into minute molecules, then combining it with water and emulsifier to form a permanent suspension that can be brushed on or sprayed.

Trade-named Tarlac, this coating is said to be impervious to oils, greases, acids, alkalis, water and condensation. Developed as a protective coating for concrete, metal, mastic and wood floors or structures, it reportedly will not crack at low temperatures or run at high temperatures.

It dries to a flat, black film, is insoluble in water, oil or gasoline, can be thinned when necessary with water, and covers up to 300 sq. ft. per gal.—*Flash-Stone Co., Inc., Philadelphia 44.*

Circle 119E on Reader Service Card

Non-Toxic Wall Wash Stops Molds, Mildew

A new antiseptic wall wash, formulated to control of molds and mildew without harsh caustic or toxic materials, is now on the market.

Furnished in concentrated form to permit dilution in water, Fungitox, as it is called, also provides a colorless residual film said to inhibit further growth. It has a mild odor, is non-irritating to the user, does not discolor painted surfaces, and may be used on wood, concrete, plaster, wallboard, canvas or other fabrics, and rubber and plastics. Generally, application is by brush or sponge.

According to the manufacturer, a scrubbing with Fungitox prior to painting acts to prevent mold-growth, thus extending the intervals between paint jobs.—*Fungitrol Chemicals, Inc., Hillside, N. J.*

Circle 119F on Reader Service Card

In Behalf of Progress . . .

Your Problems and Opportunities in 1952

Not since World War II years have the men who direct the destinies of food companies faced a year that will challenge their talents as much as will 1952.

It will be a good year in respect to overall production and sales volume. This is indicated by the 2,000,000 population growth, further increase in the armed forces, continued high-level incomes, cutback of durables, and high farm production.

But good volume is about the only encouraging sign in the crystal ball. Profits after taxes—already too low to adequately finance progress—will be further pinched by rising costs, particularly that of labor. Scarcity of materials will make new plant facilities and equipment more difficult to obtain. The personnel problem will worsen. Technical help will grow more scarce.

As if those aren't enough troubles, the industry will be under more pressure to eliminate waste, odor, and smoke nuisances and to improve sanitation. It faces insecticide problems, food law and standards changes, and a public relations problem.

But increasing productivity to protect profits is your most vital task in 1952. To indicate what can be done, here are a few profit-improving advances in major phases of food plant operations:

1. **Automatic Batching**—Flow meters, weigh-scale proportioners, vibrating feed conveyors, homogenizer premixing of minor ingredients, and ingredient scales with photoelectric batching control are saving time, assuring uniform quality.

2. **Continuous Processing**—This is a big factor in increasing productivity, capacity and quality and in making sanitation easier. There is much current interest in continuous aseptic canning, both because of its efficiency and its quality improving aspects. Work is being done, too, with continuous heat exchangers in cooking starch-jelly candies, cooling peanut butter, and cooking and cooling starch-vinegar slurry in making salad dressing. And much headway is being made in the continuous mixing of cake batters, marshmallow, cream pie topping, and custard products.

3. **Automatic Control**—Many processors are increasing capacity, saving labor, and improving quality by employing automatic controllers, even on batch processes. And instruments are continually finding new applications, such as in density control, split-degree regulation of continuous air-flow coolers, continuous beer blending, and close regulation of bread dough mixing.

4. **Automatization**—Automatic movement of products, such as frozen foods or bread dough, into and out of processing units and to and from conveyors is saving labor in many plants.

5. **Packaging**—Emphasis now is on production-line performance of materials and containers, and, of course, product protection. Artistic design is subordinated to productivity. Machine capacities are steadily being stepped up and changeover time reduced. Automatic check-weighing is saving time and overfill, as is statistical quality control. Carton printers and thermoplastic labeling offer opportunities, as do gas and vacuum packing in improved flexible containers.

6. **Materials Handling**—Since food processing is to a great extent a business of moving and packaging materials, much is being done to cut handling costs. Palletizing continues to gain and automatic pallet loaders are in use. More and more free-flowing products are being handled in bulk, the latest being liquid chocolate, which is hauled in tank trucks and pumped to storage and to process. Automatic case unloaders and loaders, as well as automatic soaker loaders, are rapidly being installed in bottling plants.

7. **Sanitation**—The significant cost of cleanup in food plants is being reduced with power cleaning equipment, permanent pipelines, and better detergent formulas. Outstanding is the easy handling of tough cleaning jobs with high-pressure jet units.

8. **Maintenance**—Wise management is establishing well-organized maintenance programs to reduce down-time, make machines operate longer at top efficiency and determine when a machine should be replaced with a new one. This year, effective maintenance will pay especially well. It may even avoid shutting down lines for lack of new equipment or parts.

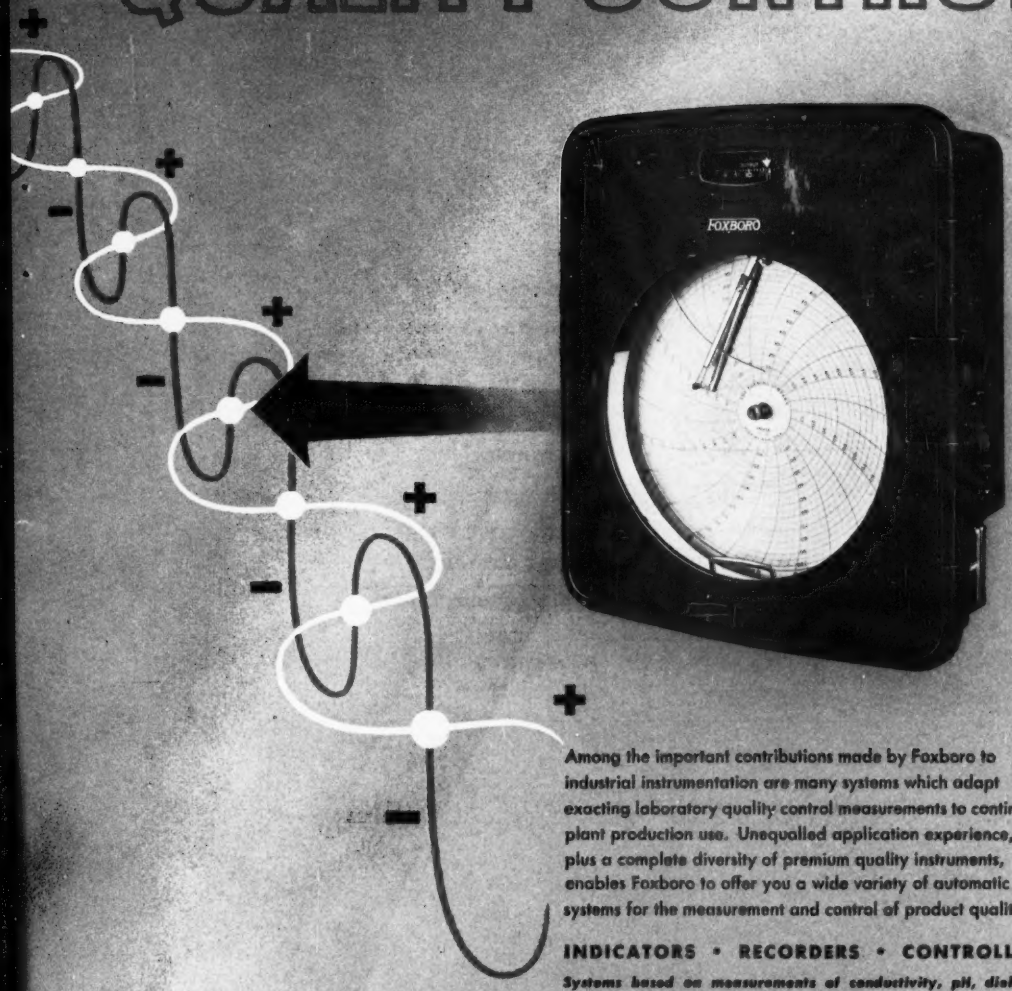
9. **Personnel**—Productivity of workers is being increased through work simplification and by more intelligent selection and placement of workers. Incentive pay can do wonders in some operations. And giving workers a proper knowledge of free enterprise—your business in particular—helps productivity and reduces turnover. Understanding employees take more interest in their jobs.

10. **Public Relations**—Productivity depends upon volume, and volume upon consumer demand. Demand is affected by adverse publicity for processed foods, such as came from the chemicals controversy. Therefore, food processors should help to correct existing misconceptions. They also should let the public in on the secret that they make very little profit.

Not all-inclusive, the developments cited typify your opportunities. Make the most of them. For 1952 will separate the men from the boys in the food industry.

better instrumentation for

QUALITY CONTROL



Among the important contributions made by Foxboro to industrial instrumentation are many systems which adapt exacting laboratory quality control measurements to continuous plant production use. Unequalled application experience, plus a complete diversity of premium quality instruments, enables Foxboro to offer you a wide variety of automatic systems for the measurement and control of product quality.

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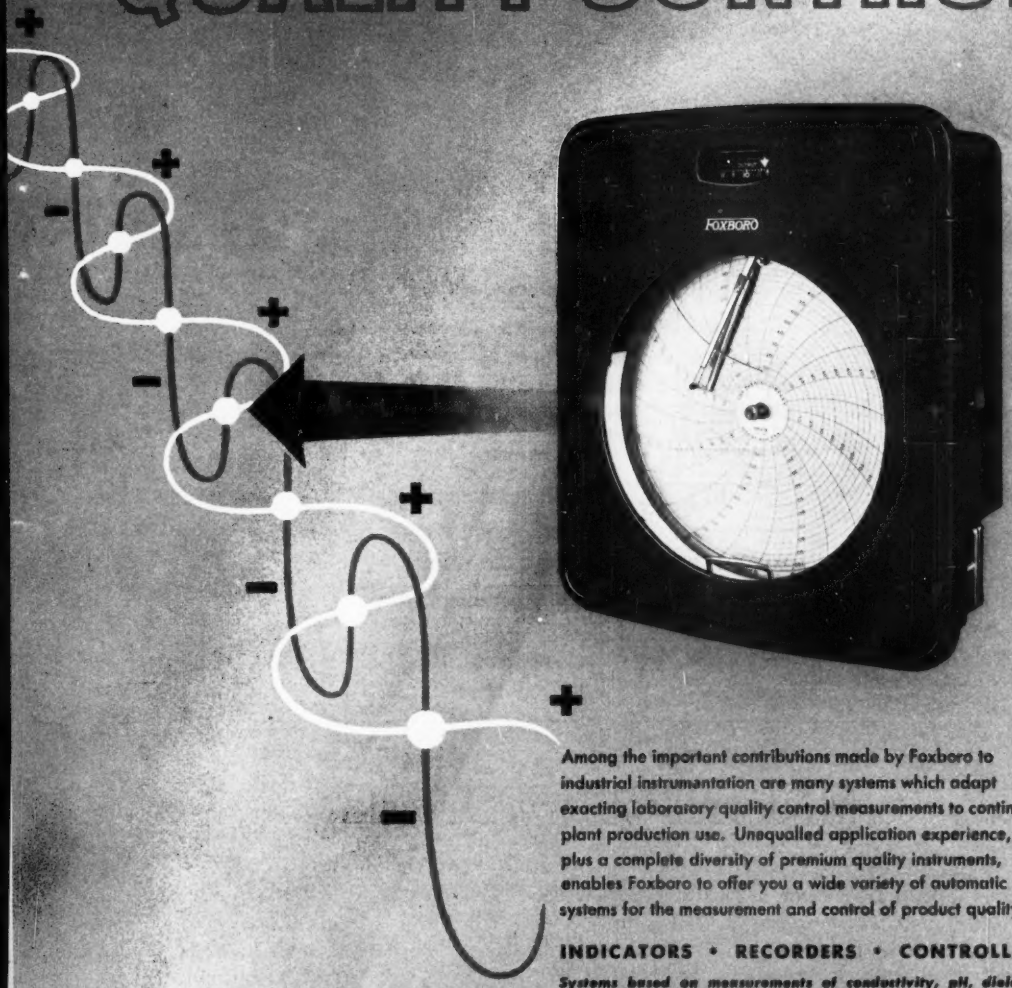

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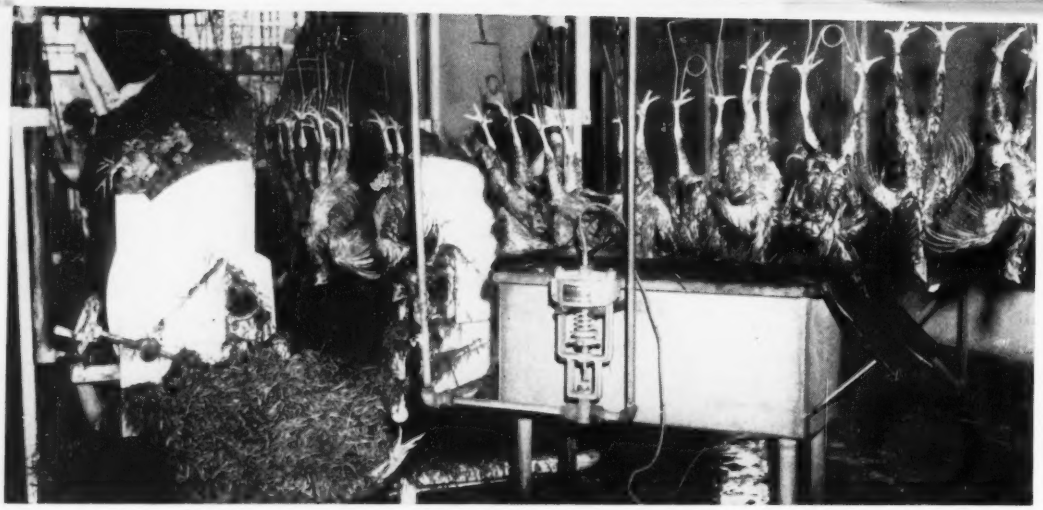
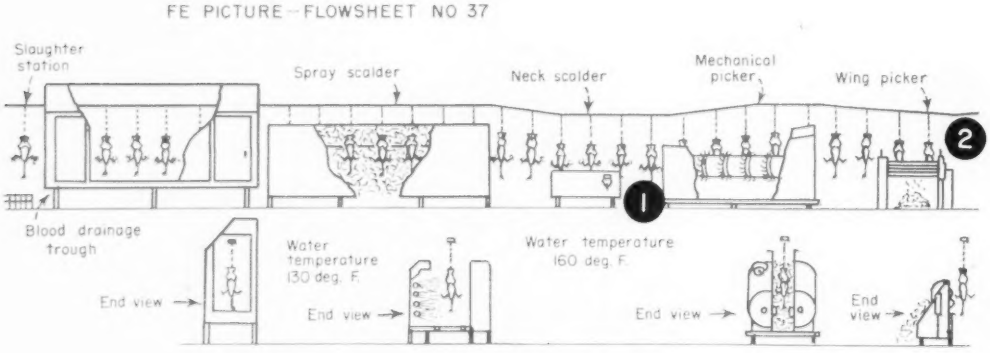


1 **NECK SCALDER** (right), with water instrument-controlled at 160 deg. F., loosens feathers. Left: Rotating rubber strips of mechanical picker than plucks most of feathers without damage to skin or flesh of fowl.



Modern Poultry Dressing

Mass Production Line Delivers 2,000 Dressed, Eviscerated Chickens Per Hour

AS NEEDED to fill orders, chickens of uniform size and weight are truck-transported from growing houses at the Armour and Company plant, Salesbury, Md., and immediately processed. Rarely do even 30 min. elapse from growing house to slaughter.

After killing, birds hang head down from an overhead chain conveyor and drain in a blood-collecting trough before entering a spray scalder, where 124-deg-F. water loosens feathers. Necks are then subjected to additional scalding in a water bath regulated to 160 F.—Point (1) in the accompanying diagram.

Primary plucking is mechanical: As birds travel suspended by their legs through the picker, most body and neck feathers are removed by the machine's rotating rubber flails. Persistent, heavy wing-feathers are extracted when an operator inserts wings between rubber rolls.

Final defeathering is accomplished when operators hold still-feathered portions of backs, breasts and legs against corrugated horizontal rolls with soft rubber surfaces. Pin feathers are hand picked.

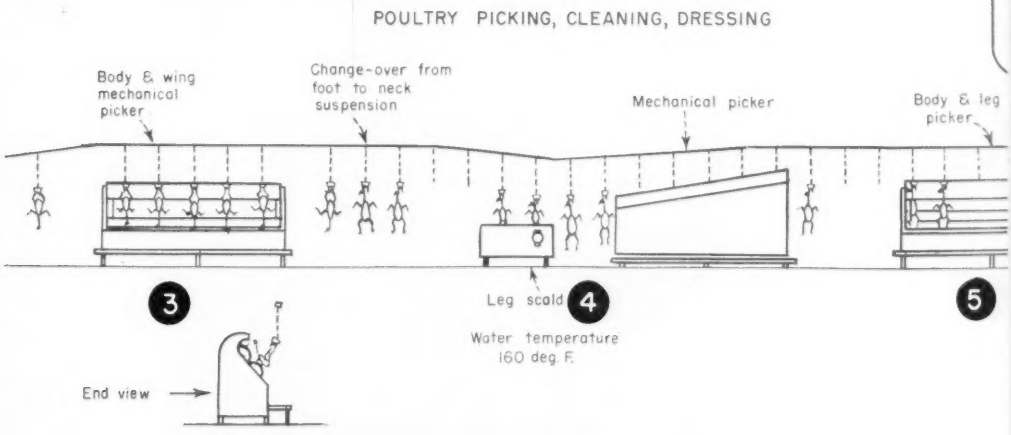
Next, continuous mechanical gas-flame singeing—Point (6)—followed by cold water spray washing, finishes prepa-

"How" of Overall Supervision

—is revealed in this month's special article, "Egg-to-Market Control Assures Top-Quality Poultry" . . . along with details of "hot evisceration" and other advanced practices. Just turn to page 68.

2 **SOFT RUBBER ROLLS** of wing picker, rotating in opposite directions, extract heavy wing feathers.

3 **NEXT OPERATOR** thrusts wings between rotating drums, holding breast on lower roll.



ration for the "New York Dressed" (unеviscerated) portion of the poultry.

Most of the 2,000 birds processed per hour are then eviscerated and, after removal, the entrails and giblets, accompany the fowl through Federal Inspection in pans on a conveyor synchronized with the trolley conveyor.

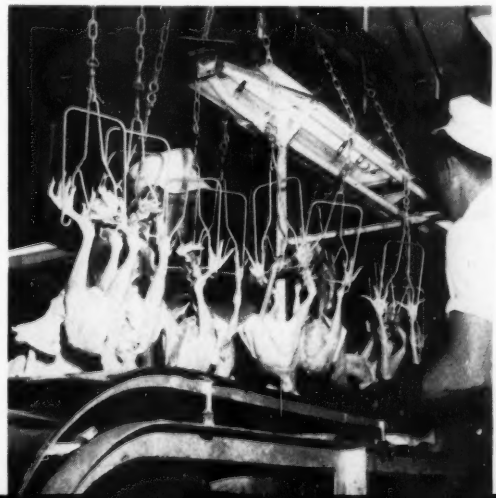
Eviscerated fowl continue with the conveyor, while giblets go by chute to the giblet cleaning station. Here, gizzard linings are mechanically separated from the meats, which are then washed, as are other giblets, and filled into stainless containers for immediate refrigeration to 38 deg. F.

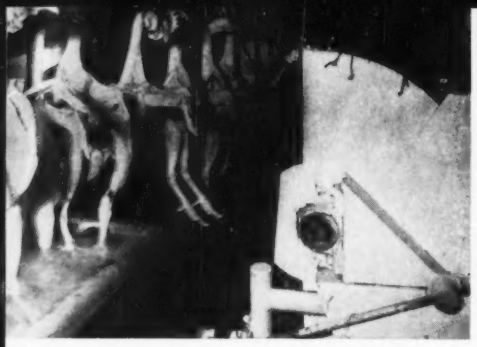
When cold, an assembly of giblets is packaged in parchment bags, stapled, and delivered to the packing station to be placed in the body cavity of the whole fowl.

When inspected fowl leave the eviscerating station, the inside of each is washed by hosing, following which membranous tissue is sucked out by a vacuum tube—Point (9). After immediate icing, dressed fowl is ready for packing.

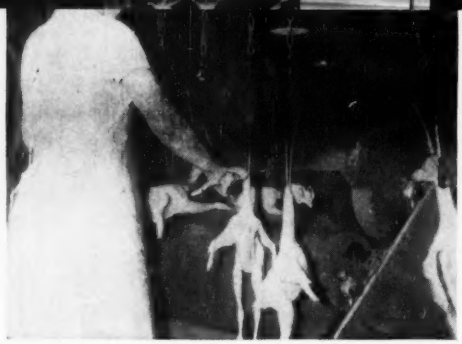
Of late, an increasing portion of the pack is being side-tracked to a long overhead merry-go-round conveyor at ceiling height, above an extensive suspended drain pan. Here, both body and surface moisture drains before birds descend to the long stainless center-conveyor-type cutting-table. Resulting pieces may be packaged as all-breast, all-wings, or as complete cut fowl.

8 **OVERHEAD CONVEYOR** splits at cutting station so that two rows of workers can eviscerate on separate lines.

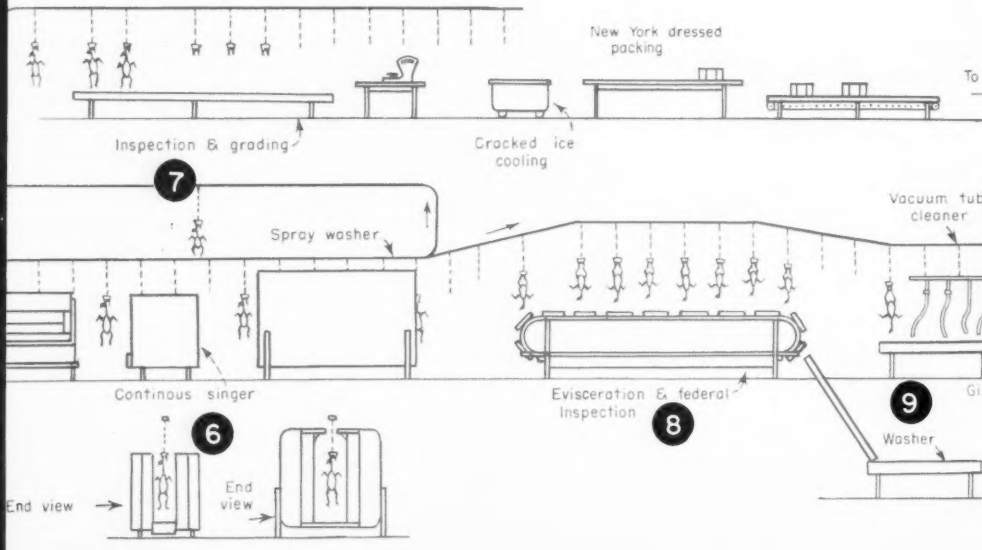




POULTRY LEGS pass through 160-deg.-F. scalding bath, are then cleaned (right) by thresher-type plucker.

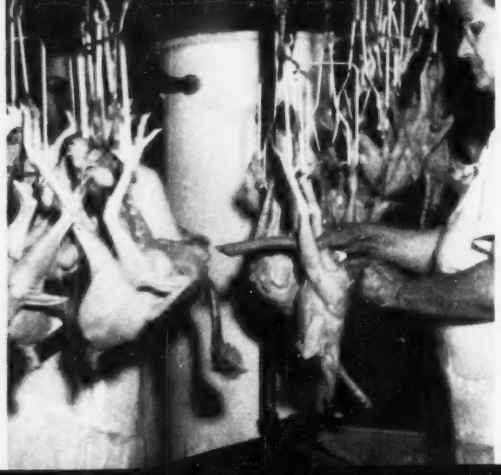


5 WHEN LAST of large feathers have been machine-plucked (above), birds move on for job on pin feathers.

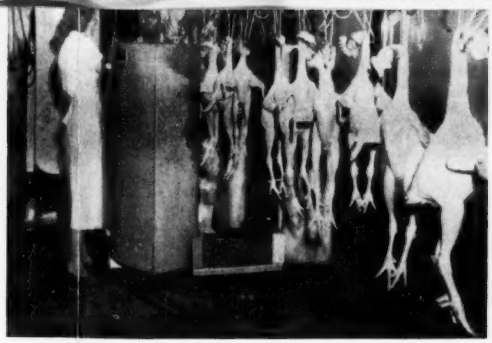


9 METAL TUBE attached to vacuum line is thrust into body cavity for thorough removal of membranous tissue.

10 GIZZARD LININGS are cleanly separated from m machine, then fall into discard chute, below st

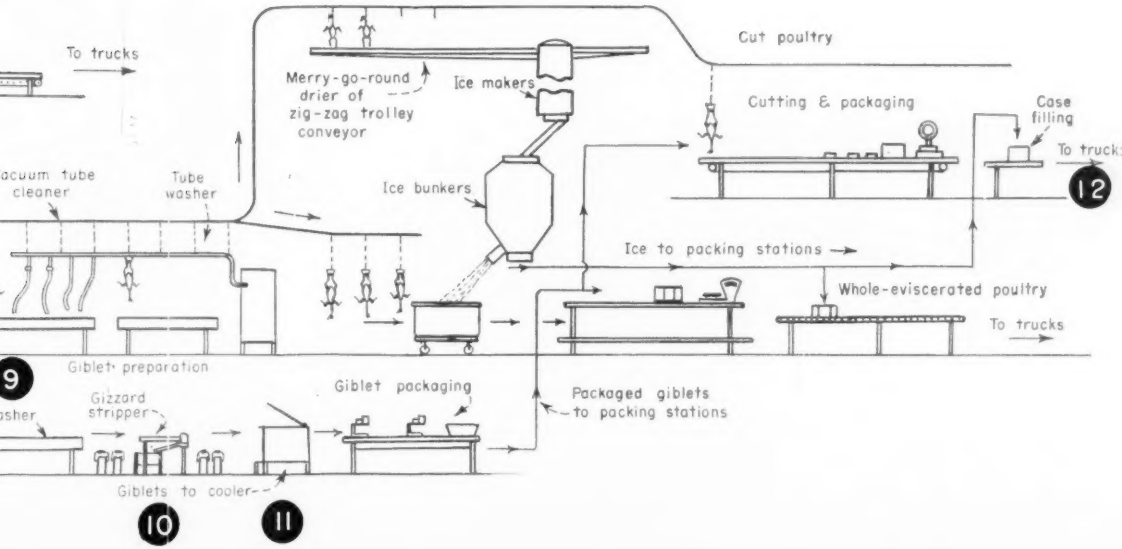


machine-
feathers.



6 **DEFEATHERED FOWL** are dehaired in continuous-singe unit (foreground). Cleaning in cold-spray washer follows.

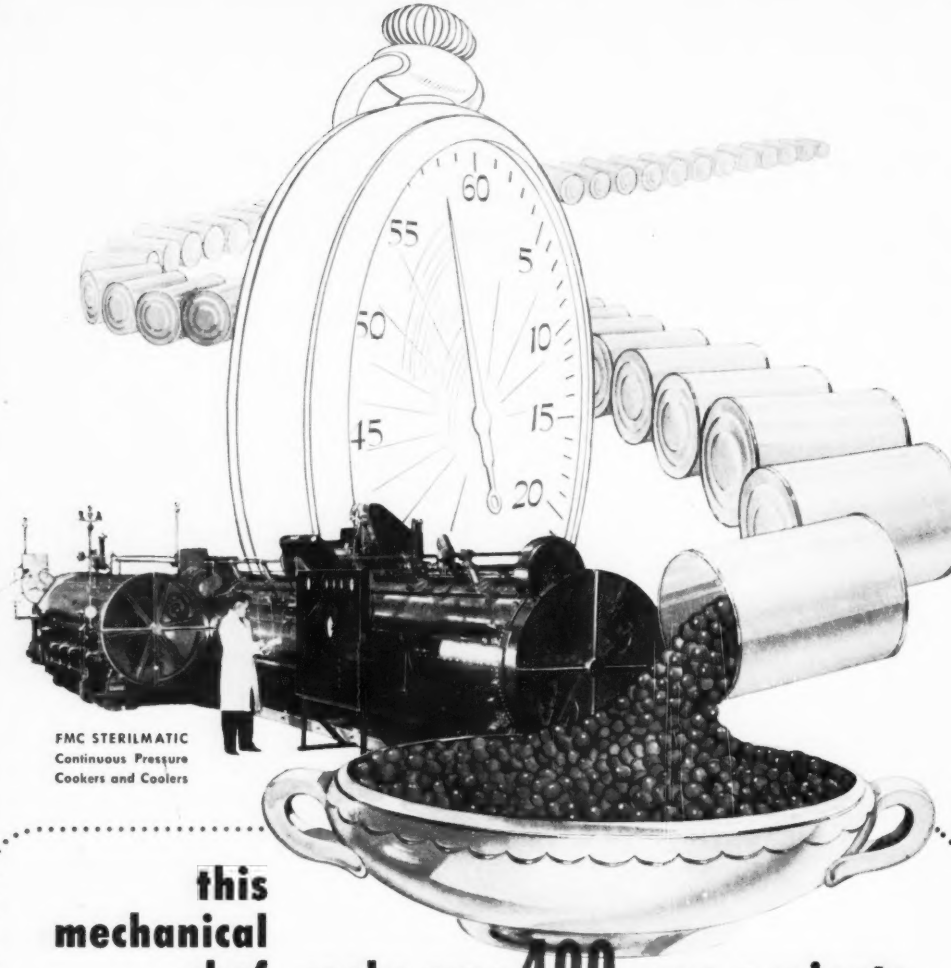
7 **INSPECTION STATION.** Small portion of the pack is seen being graded, weighed, iced and packed as "New York Dressed."



ed from meat by
below stripper.

11 **WASHED GIBLETS** are cooled in stainless containers to 38 F. Later, they're packed in parchment bags.

12 **PACKED** in wire-bound wood cases, dressed poultry is iced and conveyed directly to truck trailers for trip to market.



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this mechanical chef cooks over 400 cans a minute

Typical of the many contributions perfected by FMC's Canning Machinery Division is this giant "one-man cook room" that automatically pressure-cooks garden fresh peas and a host of other canned foods at speeds from 250 to 450 cans per minute, depending on size of container and type of product. Employed by leading canners, the amazing *Sterilmatic* Processing Equipment retains the essential vitamins and delicate natural color and flavor that make food so appetizingly enjoyable. Through rapid and even high temperature heat penetration, every can is cooked exactly alike. The result is a uniform, controlled quality pack—at greatly reduced processing costs. Plan now to investigate the many advantages found only in FMC *Sterilmatic* Processing Equipment. Write for full information, or call your nearest FMC representative.

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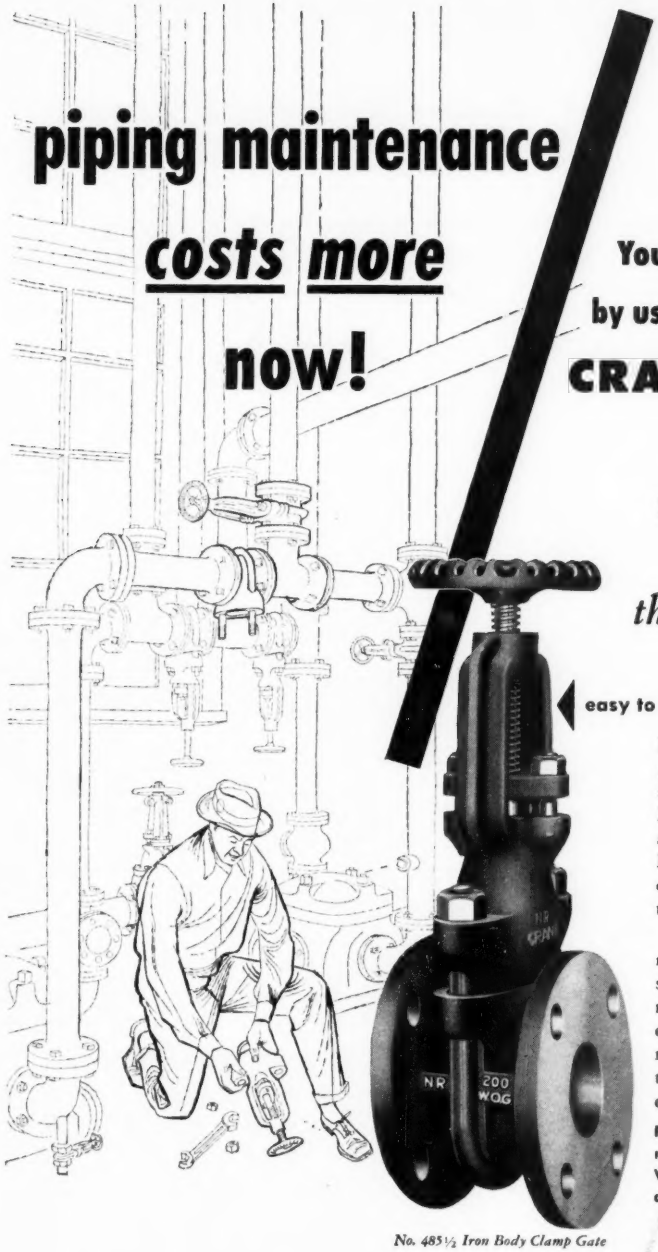

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It's no trick to dismantle this clamp gate valve for inspection, cleaning, or servicing. Just remove two nuts and lift out the complete bonnet and disc assembly. The body stays in the line. Reassembling is just as easy. Repeated opening does not affect bonnet joint tightness or alignment.

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HOW TO HELP BRITAIN ...and Ourselves

The purpose of this editorial is to help Winston Churchill obtain the aid Britain needs

(1) to weather her present financial crisis, and

(2) to avoid a chronic recurrence of such crises.

This is not a philanthropic purpose.

Britain is our staunchest ally in the free world's continuing fight for survival. She cannot perform her role effectively if she is broke, or if she careens from one financial crisis to another.

Then, too, a nation such as ours—committed to private enterprise as a way of economic life—has a special interest in helping Winston Churchill to help Britain. His administration is relatively friendly toward private enterprise. Should he fail, he would be replaced promptly by a Socialist government more hostile than ever. And that would weaken the standing of private enterprise in the free world.

Cause of the Crisis

It is the drive of the Western World under our leadership to rearm against Russian aggression that has precipitated Britain's financial crisis. It set off a scramble for raw materials from which armaments could be made, and for many other materials that might be short in the event of war. So the prices of the things that Britain must import—mostly raw materials—have been boosted more than the prices of things she can export—mostly finished products. That leaves Britain short of funds to pay for essential imports. This difficulty increases as the necessity becomes more urgent to divert industrial effort from production for export to production for security.

The Basic Trouble

Although Britain's immediate crisis was touched off by the rearmament drive of the Western World, her basic affliction is one from which she has suffered since the end of World War II. Stated in its simplest terms, Britain does not produce enough goods to pay her own way as one of the family of free nations.

For years this deficiency in home production was made up by income from shipping and overseas investment. But Britain had to sell a large part of her foreign investments to finance her heroic part in World War II. So her income from that source has been greatly reduced. And, in spite of an increase of about a third above prewar in her own production of goods and—thanks to a continued "austerity" program—a much larger increase in her exports, Britain still is not paying her own way.

Two Ways to Solvency

Britain has two ways to restore her solvency. One is to cut down on what is consumed—the belt-tightening process. The other is to step up British production.

To surmount the present crisis, Mr. Churchill has asked for some cutting down. He probably must ask for more.

Except as a stop-gap expedient, however, more cutting down of Britain's consumption is clearly a dangerous course. That would further depress a British standard of living which, not more than half as high as ours, already is too low. Politically such a course would grease the skids for Winston Churchill's administration, even now governing by a wafer-thin parliamentary margin. Also, as *The* (London) *Economist* remarks, the "lazy expedient of cutting trade" would result in "hurting other people and forcing them to take similar action"—by cutting the market for their products.

The Only Cure

The best and, in fact, the only way to help cure Britain's economic ills is to help Britain produce more. Here the technical possibilities are encouraging. On the average, the British industrial worker produces only about 40 percent as much a year as the American worker. That is a British estimate, made by Sir Ewart Smith.

Wider use of better industrial methods and modern tools and an infusion of the competitive incentive into British industry — to replace the cartel and other restrictive practices — would go a long way to narrow this wide gap in worker productivity. This is the consensus of experts on both sides of the Atlantic.

Since 1948 the Anglo-American Council on Productivity has done much to encourage output per man-hour in Britain and to foster this doctrine with both labor and management. But much yet remains to be done.

In the United States it is increasingly suggested that before we give Britain any more economic aid we should insist that everything possible be done to exploit the technical possibilities of increased production. This emphasis on production is needed. But if we Americans were to impose upon the hard-pressed British people conditions that could be construed as an affront to a friendly and sovereign nation, we might well put into the hands of a masterful rabble-rouser such as Aneurin Bevan, the anti-American leader of the Labor Party's left wing, a campaign issue on which to maneuver himself into the Prime Ministership.

Churchill Can Insist

But Winston Churchill is not so handicapped as we should be in imposing prerequisites of further aid. As Britain's own, most honored leader he will raise no touchy questions as to Anglo-American relations if he insists that Britain have firm plans to cure her economic ills, plans sharply focussed on ways and means of increasing Britain's industrial efficiency.

By presenting a convincing plan to cure Britain's recurring crises through greater production, Mr. Churchill will greatly facilitate the process of getting the aid his country must have. He will also remove an increasingly dangerous element of dissension in Anglo-American relations — the feeling of many Americans that more aid to Britain is more money down the drain. The way to counter that feeling is to come up with a prescription for an economic cure, not a request for another economic poultice.

Technically, such a program is entirely feasible. It will perhaps be the supreme test of Winston Churchill's statesmanship to make it politically feasible as well.

In the interest of Britain, of the United States and of the whole free world, we wish him all success.

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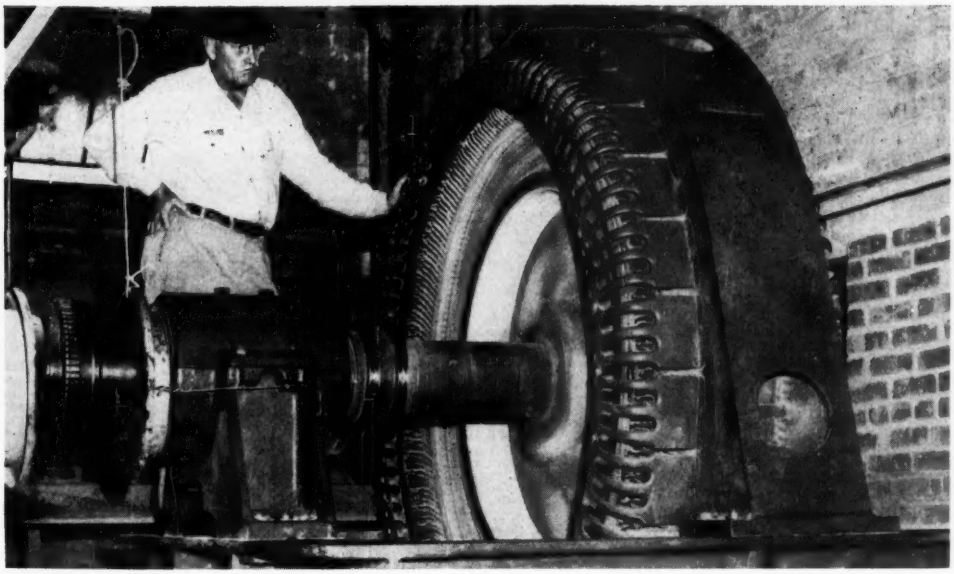


IN FLOUR MILL, this General Electric 600-hp. synchronous motor, driving a grinder, improves the plant power factor.

SYNCHRONOUS MOTORS
Up Plant Power Factor

Their installation adds to kw. load without increasing reactive kva. load. Further, new drive tends to stabilize system voltage

J. C. MOORE
Large Motor and Generating Department,
General Electric Co., Schenectady, N. Y.

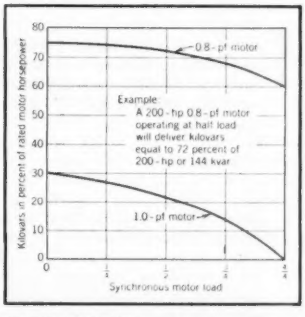
The combined economic and operating advantages of synchronous motors make their consideration worthwhile where any plant requires a new large motor drive.

In many instances the installation of synchronous motors is the most economical method of improving plant power factor in light of their ability to provide efficient mechanical power at the same time.

In these days of rapidly expanding production, with the consequent upswing in the installation of machinery, many plant engineers are concerned about increasing the load on power systems that are already loaded almost to capacity. Others are contemplating the addition of new power systems where existing systems obviously cannot handle an expanding plant load.

In either case, a high plant power factor is of prime importance—because the load which any power system will carry is proportional to the plant power factor, which is expressed as kw. load divided by the kva. load. The efficiency of the whole plant power system increases as the power factor approaches unity. A higher power factor may make it possible to safely increase the hp. load on an existing system. Where a new system is required, it can also mean less investment in transformers, feeder lines, and voltage regulating devices.

Good operating conditions require a high power factor, too. A poor factor often results in voltage drops which increase the slip of induction motors to the point where production is adversely affected. If the voltage falls more than 10 percent below normal, it is quite possible for induction motors to become overheated or stall. And high losses, poor plant lighting conditions, high power bills, and increased maintenance of the



THESE CURVES show the approximate kilovars supplied by synchronous motors.

power supply commonly accompany a poor power factor.

In most systems, a poor factor is caused by excessive demands for magnetizing current (reactive kva.) by induction motors at part loads, transformers, electric furnaces, electric welders, and other inductive equipment. This magnetizing current, although necessary, does no useful work, of course. It limits the power which a system can carry.

When a new motor drive (75 hp. or larger) is needed in a plant, the installation of a synchronous motor can economically improve a plant's power factor. A unity power factor synchronous motor (current in phase with the voltage) accomplishes this by adding to the kw. load on a power system without increasing the reactive kva. load, since it needs no magnetizing current to operate when normally excited at full load.

In other words, it brings the ratio, kw./kva., closer to 1. For example, if a 1,000-hp. unity power factor synchronous motor is added to a 1,000-hp. plant load having a power factor of .80, the new load of 2,000 hp. would have a power factor of .935.

A leading power factor synchronous motor (current leading the voltage) improves the plant power factor because it acts as a kilovar generator. It can

(*Turn to page* 185)

TABLE I—USE THESE Kw. Multipliers for Determining Kilovars Required for Power-Factor Improvement

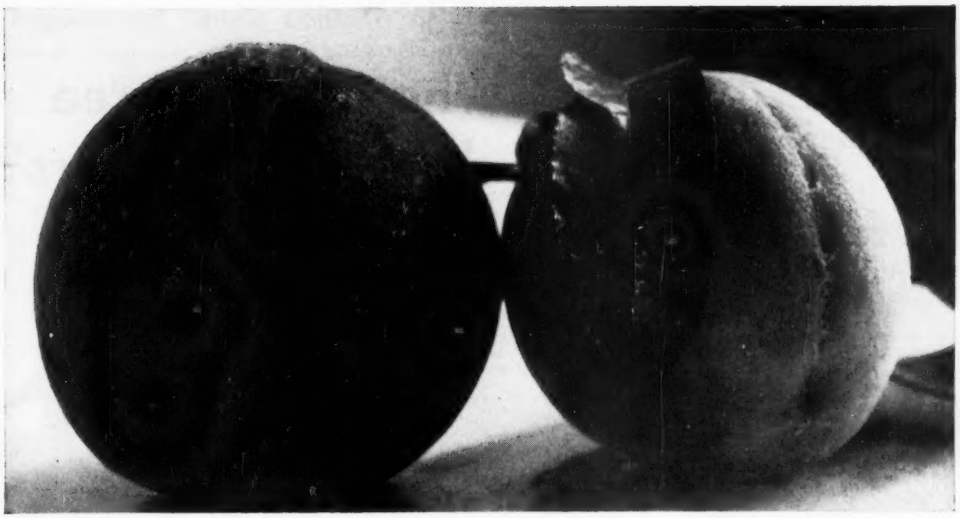
Original Power Factor (cos θ_1)	Desired Improved Power Factor (cos θ_2)																			
	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.0
0.50	0.982	1.008	1.034	1.060	1.086	1.112	1.139	1.165	1.192	1.220	1.248	1.276	1.306	1.337	1.369	1.403	1.440	1.481	1.529	1.589	1.732
0.51	0.937	0.962	0.989	1.015	1.041	1.067	1.094	1.120	1.147	1.175	1.203	1.231	1.261	1.292	1.324	1.358	1.395	1.436	1.484	1.544	1.687
0.52	0.893	0.919	0.945	0.971	0.997	1.023	1.050	1.076	1.103	1.131	1.159	1.187	1.217	1.248	1.280	1.314	1.351	1.392	1.440	1.500	1.643
0.53	0.850	0.876	0.902	0.928	0.954	0.980	1.007	1.033	1.060	1.088	1.116	1.144	1.174	1.205	1.237	1.271	1.308	1.349	1.397	1.457	1.600
0.54	0.809	0.835	0.861	0.887	0.913	0.939	0.966	0.992	1.019	1.047	1.075	1.103	1.133	1.164	1.196	1.230	1.267	1.308	1.356	1.416	1.559
0.55	0.769	0.795	0.821	0.847	0.873	0.899	0.926	0.952	0.979	1.007	1.035	1.063	1.093	1.124	1.156	1.190	1.227	1.268	1.316	1.376	1.519
0.56	0.730	0.756	0.782	0.808	0.834	0.860	0.887	0.913	0.940	0.968	0.996	1.024	1.054	1.085	1.117	1.151	1.188	1.229	1.277	1.337	1.480
0.57	0.692	0.718	0.744	0.770	0.796	0.822	0.849	0.875	0.902	0.930	0.958	0.986	1.016	1.047	1.079	1.113	1.150	1.191	1.239	1.299	1.442
0.58	0.655	0.681	0.707	0.733	0.759	0.785	0.812	0.838	0.865	0.893	0.921	0.949	0.979	1.010	1.042	1.076	1.113	1.154	1.202	1.262	1.405
0.59	0.619	0.645	0.671	0.697	0.723	0.749	0.776	0.802	0.829	0.857	0.885	0.913	0.943	0.974	1.006	1.040	1.077	1.118	1.166	1.226	1.369
0.60	0.583	0.609	0.635	0.661	0.687	0.713	0.740	0.766	0.793	0.821	0.849	0.877	0.907	0.938	0.970	1.004	1.041	1.082	1.130	1.190	1.333
0.61	0.549	0.575	0.601	0.627	0.653	0.679	0.706	0.732	0.759	0.787	0.815	0.843	0.873	0.904	0.936	0.970	1.007	1.048	1.096	1.156	1.299
0.62	0.516	0.542	0.568	0.594	0.620	0.646	0.673	0.699	0.726	0.754	0.782	0.810	0.840	0.871	0.903	0.937	0.974	1.015	1.063	1.123	1.266
0.63	0.483	0.509	0.535	0.561	0.587	0.613	0.640	0.666	0.693	0.721	0.749	0.777	0.807	0.838	0.870	0.904	0.941	0.982	1.030	1.090	1.233
0.64	0.451	0.474	0.503	0.529	0.555	0.581	0.608	0.634	0.661	0.689	0.717	0.745	0.775	0.806	0.838	0.872	0.909	0.950	0.998	1.058	1.201
0.65	0.419	0.445	0.471	0.497	0.523	0.549	0.576	0.602	0.629	0.657	0.685	0.713	0.743	0.774	0.806	0.840	0.877	0.918	0.966	1.026	1.169
0.66	0.388	0.414	0.440	0.466	0.492	0.518	0.545	0.571	0.598	0.626	0.654	0.682	0.712	0.743	0.775	0.809	0.846	0.887	0.935	0.995	1.138
0.67	0.358	0.384	0.410	0.436	0.462	0.488	0.515	0.541	0.568	0.596	0.624	0.652	0.682	0.713	0.745	0.779	0.816	0.857	0.905	0.965	1.108
0.68	0.328	0.354	0.380	0.406	0.432	0.458	0.485	0.511	0.538	0.566	0.594	0.622	0.652	0.683	0.715	0.749	0.786	0.827	0.875	0.935	1.078
0.69	0.299	0.325	0.351	0.377	0.403	0.429	0.456	0.482	0.509	0.537	0.565	0.593	0.623	0.654	0.686	0.720	0.757	0.798	0.846	0.906	1.049
0.70	0.270	0.296	0.322	0.348	0.374	0.400	0.427	0.453	0.480	0.508	0.536	0.564	0.594	0.625	0.657	0.691	0.728	0.769	0.817	0.877	1.020
0.71	0.242	0.268	0.294	0.320	0.346	0.372	0.399	0.425	0.452	0.480	0.508	0.536	0.566	0.597	0.629	0.663	0.700	0.741	0.789	0.849	0.992
0.72	0.214	0.240	0.266	0.292	0.318	0.344	0.371	0.397	0.424	0.452	0.480	0.508	0.538	0.569	0.601	0.635	0.672	0.713	0.761	0.821	0.964
0.73	0.186	0.212	0.238	0.264	0.290	0.316	0.343	0.369	0.396	0.424	0.452	0.480	0.510	0.541	0.573	0.607	0.644	0.685	0.733	0.793	0.936
0.74	0.159	0.185	0.211	0.237	0.263	0.289	0.316	0.342	0.369	0.397	0.425	0.453	0.483	0.514	0.546	0.580	0.617	0.658	0.706	0.766	0.909
0.75	0.132	0.158	0.184	0.210	0.236	0.262	0.289	0.315	0.342	0.370	0.398	0.426	0.456	0.487	0.519	0.553	0.590	0.631	0.679	0.739	0.882
0.76	0.105	0.131	0.157	0.183	0.209	0.235	0.262	0.288	0.315	0.343	0.371	0.399	0.429	0.460	0.492	0.526	0.563	0.604	0.652	0.712	0.855
0.77	0.079	0.105	0.131	0.157	0.183	0.209	0.236	0.262	0.289	0.317	0.345	0.373	0.403	0.434	0.466	0.500	0.537	0.578	0.626	0.686	0.829
0.78	0.052	0.078	0.104	0.130	0.156	0.182	0.209	0.235	0.262	0.290	0.318	0.346	0.376	0.407	0.439	0.473	0.510	0.551	0.599	0.659	0.802
0.79	0.026	0.052	0.078	0.104	0.130	0.156	0.183	0.209	0.236	0.264	0.292	0.320	0.350	0.381	0.413	0.447	0.484	0.525	0.573	0.633	0.776
0.80	0.000	0.026	0.052	0.078	0.104	0.130	0.157	0.183	0.210	0.238	0.266	0.294	0.324	0.355	0.387	0.421	0.458	0.499	0.547	0.609	0.750
0.81		0.000	0.026	0.052	0.078	0.104	0.131	0.157	0.184	0.212	0.240	0.268	0.298	0.329	0.361	0.395	0.432	0.473	0.521	0.581	0.724
0.82			0.000	0.026	0.052	0.078	0.105	0.131	0.158	0.186	0.214	0.242	0.272	0.303	0.335	0.369	0.406	0.447	0.495	0.555	0.698
0.83				0.000	0.026	0.052	0.079	0.105	0.132	0.160	0.188	0.216	0.246	0.277	0.309	0.343	0.380	0.421	0.469	0.529	0.672
0.84					0.000	0.026	0.053	0.079	0.106	0.134	0.162	0.190	0.220	0.251	0.283	0.317	0.354	0.395	0.443	0.503	0.646
0.85						0.000	0.027	0.053	0.080	0.108	0.136	0.164	0.194	0.225	0.257	0.291	0.328	0.369	0.417	0.477	0.620
0.86							0.000	0.026	0.053	0.081	0.109	0.137	0.167	0.198	0.230	0.264	0.301	0.342	0.390	0.450	0.593
0.87								0.000	0.027	0.055	0.083	0.111	0.141	0.172	0.204	0.238	0.275	0.316	0.364	0.424	0.567
0.88									0.000	0.028	0.056	0.084	0.114	0.145	0.177	0.211	0.248	0.289	0.337	0.397	0.540
0.89										0.000	0.028	0.056	0.086	0.117	0.149	0.183	0.220	0.261	0.309	0.369	0.512
0.90											0.000	0.028	0.058	0.089	0.121	0.155	0.192	0.233	0.281	0.341	0.484
0.91												0.000	0.030	0.061	0.093	0.127	0.164	0.205	0.253	0.313	0.456
0.92													0.000	0.031	0.063	0.097	0.134	0.175	0.223	0.283	0.426
0.93														0.000	0.032	0.066	0.103	0.144	0.192	0.252	0.395
0.94															0.000	0.034	0.071	0.112	0.160	0.220	0.363
0.95																0.000	0.037	0.079	0.126	0.186	0.329
0.96																	0.000	0.041	0.089	0.149	0.292
0.97																		0.000	0.048	0.108	0.251
0.98																			0.000	0.060	0.203
0.99																				0.000	0.143
																					0.000

EXAMPLE: Plant has input of 200 kw. at a power factor of 80 percent. To find the reactive kva. required to raise plant power factor to desired 95 percent, multiply 200 kw. by factor found in this table under 95 percent, opposite the original power factor of 80 percent, or 0.421. Kvar required, therefore, is 200 x 0.421 or 84.2 kvar.

EXAMPLE: Here is how to find the horsepower rating of 0.8 power-factor synchronous motor needed to furnish 84.2 kvar. (as required in example above). An 0.8 power-factor synchronous motor, as shown here, furnishes 0.75 kvar. per kw. input. The 84.2 kvar. required, divided by 0.75 equals 112.3 kw. Converting this value to approximate hp. (neglect motor efficiency and divide by .746) reveals that a 150-hp. motor at 0.8 power-factor would be recommended.

TABLE II—LEADING Reactive Kva. Per Kw. Input for Synchronous Motors

Pf.	Kvar.	Pf.	Kvar.
1.00	.000	.74	.909
.99	.142	.73	.936
.98	.203	.72	.964
.97	.251	.71	.992
.96	.292	.70	1.020
.95	.329	.69	1.049
.94	.363	.68	1.078
.93	.395	.67	1.108
.92	.426	.66	1.138
.91	.456	.65	1.169
.90	.482	.64	1.201
.89	.512	.63	1.233
.88	.540	.62	1.266
.87	.567	.61	1.299
.86	.593	.60	1.333
.85	.620	.59	1.368
.84	.646	.58	1.405
.83	.672	.57	1.442
.82	.698	.56	1.479
.81	.724	.55	1.508
.80	.750	.54	1.559
.79	.776	.53	1.600
.78	.802	.52	1.643
.77	.829	.51	1.687
.76	.855	.50	1.732
.75	.882		



J. H. HALE, a variety of peach with high tannin content, discolored quickly when thawed after 8 months frozen storage.

Varietal Characteristics Influence

Browning of Frozen Peaches

Those containing large quantities of tannins and enzymes show high rates of enzymatic browning, while those with smaller amounts have lower rates

MURAD R. GRICE, H. D. BROWN and R. C. BURRELL

Respectively, College of Agriculture, Ibrahim University, Cairo, Egypt; Department of Horticulture, Ohio State University; and Department of Agriculture Biochemistry, Ohio State University

Rate of browning of frozen peaches is influenced by both tannin and polyphenolase contents of the fruit, and is retarded by addition of ascorbic acid at the time of processing.

Other antioxidants, such as a mixture of ascorbic acid and sodium oxalate alone, and rhubarb extract, were less effective than ascorbic acid alone.

These are conclusions based on studies conducted at The Ohio State University in 1950 in an effort to determine the nature of enzymatic browning in seven varieties of freestone peaches of commercial importance in the State of Ohio.

Fruits were picked when they were considered suitable for the fresh market, usually at the firm ripe stage of maturity. Then a bushel of each variety was selected at random and transported immediately to Columbus. They were placed in a 40 deg. F. storage room of the Department of Horticulture, and held for 4 to 7 days to reach a stage of maturity suitable for freezing.

A portion of the peaches was used for measuring rate of enzyme activities and the tannin and acid contents of the fresh fruits. The rest were prepared for freezing in the conventional manner, packed in plain No. 2 tin cans with 40 deg. Brix syrup (3 to 1 ratio), frozen at –20 deg. F., and stored at 0 deg. F.

Five antioxidant treatments were used in the freezing of each variety:

1. No antioxidant added.
2. Ascorbic acid 0.04 percent.
3. Sodium oxalate 0.1 percent.
4. A mixture of 0.02 percent ascorbic acid and 0.05 percent sodium oxalate.
5. Two-minute dip in a rhubarb water-extract.

After periods of 4 and 8 months storage, samples of frozen peaches were removed for analyses. These included the measurement of pH, total acidity, tannin content, total carotenoids, and an evaluation of color.

After the samples had thawed, determinations were made immediately and after 30 and 60 min., during which the samples were blended and allowed to oxidize by standing at room temperature. A brief of the methods of analyses follows.

Enzyme Activities

The activity for both polyphenolase and peroxidase was determined separately by the ascorbic acid oxidation method described by Pointing and Joslyn[1]. The rate of activity was expressed as milligrams of ascorbic acid oxidized by a given amount of the respective enzyme at 25 deg. C. per minute, under the catalytic influence of added catechol for polyphenolase and catechol and H_2O_2 for peroxidase. An Evelyn photoelectric colorimeter equipped with a 520 mμ filter was used in measuring the ascorbic acid residues.

Total Tannins

The method used was essentially that described by Guadagni *et. al.*[2] It is based on measuring the blue color produced by the reaction of

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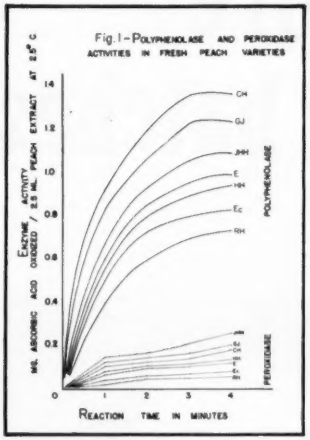
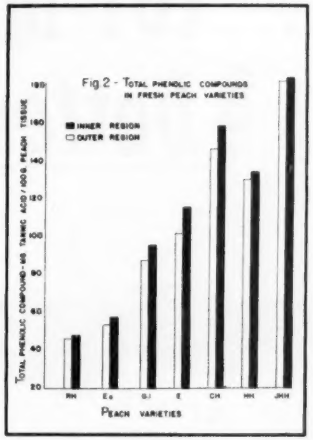
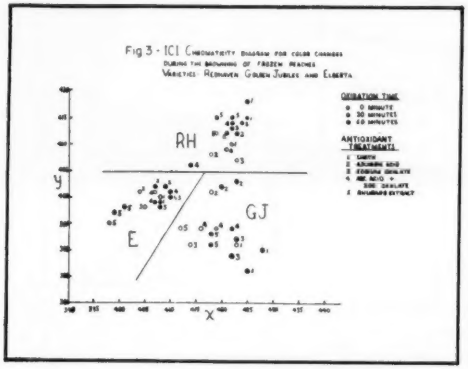
Enzyme and Tannin Contents of Fresh Peaches

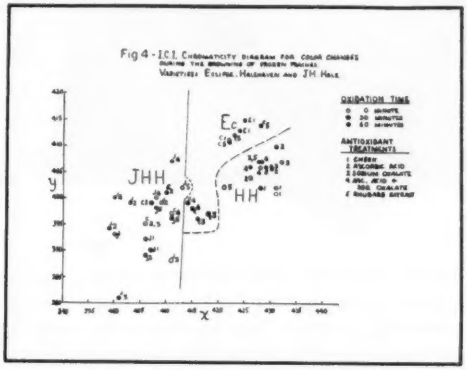
ABBREVIATIONS: CH—Champion; GJ—Golden Jubilee; JHH—J. H. Hale; E—Elberta; HH—Halehaven; Ec—Eclipse, RH—Redhaven.

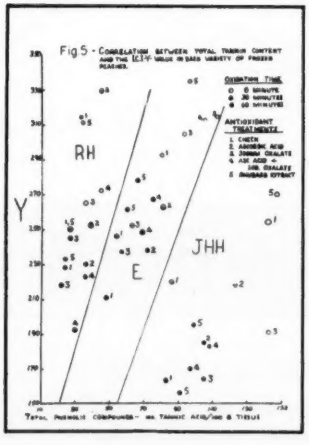


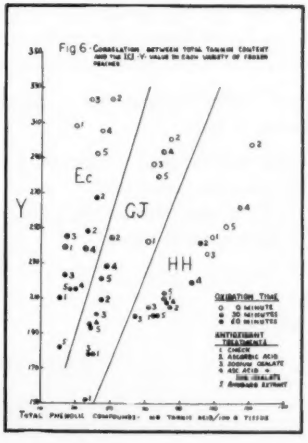


Color Changes Follow Varietal Patterns









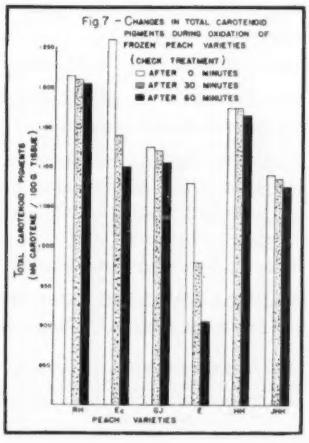


Fig. 7 - Changes in Total Carotenoid Pigments during Oxidation of Frozen Peach Varieties
(Check Treatment)
After 0 minutes
After 30 minutes
After 60 minutes
Total Carotenoid Pigments
(mg. Carotene / 100 g. Tissue)
Peach Varieties

Folin-Denis reagent" with tannin compounds after a period of time. An Evelyn colorimeter with a 660 mμ filter was used, and the tannin content was expressed in terms of ml. tannic acid/100g. peach tissue.

pH and Total Acidity

These values were determined on extracts of peach samples by means of a Beckman glass-electrode pH meter. Total acidity was expressed as ml. of 0.101 N. NaOH solution required to neutralize 10g. of tissue.

Total Carotenoid Pigments

A Fisher type Nefluoro-photometer equipped with a 440 mμ filter was used in measuring the content of these "yellow-orange" pigments in extracts of the peach samples in ethyl ether. The method used was essentially the A. O. A. C. official method[3]. Preliminary studies were made on peach extracts and carotene solutions in ethyl ether (15 percent alpha + 85 percent beta) with a G. E. recording spectrophotometer. Total carotenoids were expressed as mg. carotene per 100g. peach tissue.

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The Hunter color and color-difference meter[4] was used to obtain a quantitative estimation of colors during the browning of experimental peaches. The circuit L, a and b was used in balancing the instrument with a specially prepared maize porcelain enamel tile (the nearest color to that of yellow peach flesh).

Values of this standard color as given by Hunter were:
$L = 73.4$, $a_L = +1$ and $b_L = 31.7$.

Color specifications of the peach samples were read directly and recorded in terms of L, a_L and b_L.

In order to specify the colors of samples in terms of methods which are universally used and understood, the three-dimensional readings of Hunter's data were converted into both the I. C. I. and Munsell standard notations of color. Methods for this conversion were given by Hunter[4] and Newhall *et. al.*[5]

Results of the tests are summarized below.

Enzymatic Activities

Champion and Golden Jubilee peaches had the highest rates of polyphenolase activity (1.36 and 1.24 mg. ascorbic acid oxidized per minute). Redhaven and Eclipse had the lowest rates (.74 and .84 mg. ascorbic acid per minute), and Halehaven, Elberta and J. H. Hale had rates which were intermediate between the two extremes. (See Fig. 1.)

In all varieties the rate of polyphenolase enzyme activity was highest after 1 min. reaction and slowed down after 3 to 4 min. Activity of peroxidase enzyme was very low in all varieties.

Total Acidity, pH, and Tannins

Variation in pH values, was small and not parallel with that of total acidity. Redhaven peaches had the highest acid and relatively high pH values (3.78). Eclipse had the lowest pH (3.58) and a medium total acidity.

Acid values decreased in the untreated frozen peaches, mostly during processing, and at the beginning of the storage period. Samples treated with rhubarb extract and a mixture of ascorbic acid and sodium oxalate had higher acid values than those of other treatments.

During 1-hr. oxidation of the frozen samples, decreases in acid values occurred which varied with varieties and different antioxidant treatments.

The region of the fruit directly around the seed, which was darker in color, contained slightly higher amounts of tannins than the rest of the flesh (Fig. 2). Experimental varieties were divided into three groups according to their tannin content: J. H. Hale and Champion were high; Golden Jubilee, Elberta and Halehaven were medium; and Eclipse and Redhaven were low-tannin peaches.

Tannin content decreased upon freezing and storage due to oxidation. However, samples treated with antioxidants retained more of it than untreated ones. Ascorbic acid had the greatest inhibitory effect, and rhubarb extract had the least. Effect of sodium oxalate (0.1 percent) was relatively small and was lost after 4 months storage at a temperature of 0 deg. F.

The amounts of tannins lost during 1 hr. oxidation varied with different varieties, but were only slightly affected by different antioxidant treatments. More tannins were lost in varieties of high-tannin content than in low ones.

Carotenoid Pigments

There was a small range of variation in the content of carotenoid pigments in different varieties of frozen peaches. In descending order, however, Eclipse, Redhaven, Halehaven and Golden Jubilee contained more carotenoids than J. H. Hale and El-

TABLE I—RED HAVEN PEACHES: Color Changes During Browning of Frozen Fruit After 8 Months Storage at 0 Deg. F.

Antioxidant Treatment	Reaction Time In Minutes	Hunter's Readings			$\sqrt{a_L^2 + b_L^2}$	ICI Color Notations Tristimulus Values (1)			ICI Color Notations Trilinear Coordinates(2)			Munsell Color Notations		
		L	a_L	b_L		X	Y	Z	x	y	z	Value(3)	Hue (4)	Chroma (4)
	0	56.0	+4.7	+25.6	25.60	.323	.314	.129	.422	.410	.168	6.11/	1.25Y	/6.08
Check	30	50.0	+4.0	+23.5	23.84	.256	.250	.097	.425	.415	.161	5.54/	1.75Y	/5.79
	60	47.8	+3.2	+22.7	22.92	.232	.228	.086	.425	.418	.158	5.32/	2.40Y	/5.59
	0	57.4	+4.4	+25.6	25.98	.337	.329	.141	.418	.408	.175	6.24/	1.26Y	/5.97
Ascorbic acid	30	50.2	+4.4	+23.2	23.61	.259	.252	.101	.423	.412	.176	5.56/	1.70Y	/5.76
	60	48.0	+3.7	+22.1	22.41	.235	.230	.093	.421	.412	.167	5.34/	1.90Y	/5.41
	0	51.5	+5.6	+23.4	24.06	.276	.265	.110	.424	.407	.169	5.68/	.65Y	/5.81
Sodium oxalate	30	49.5	+3.9	+23.2	23.53	.251	.245	.096	.424	.414	.162	5.49/	1.81Y	/5.69
	60	46.7	+3.4	+21.6	21.87	.223	.218	.087	.422	.413	.165	5.22/	1.91Y	/5.38
	0	52.2	+4.6	+23.6	24.04	.280	.272	.113	.421	.409	.170	5.75/	1.31Y	/5.68
Ascorbic acid Na oxalate	30	47.2	+3.3	+22.0	22.25	.227	.223	.088	.422	.414	.164	5.27/	2.29Y	/5.42
	60	43.8	+3.0	+19.2	19.43	.196	.192	.085	.414	.406	.180	4.94/	1.92Y	/4.66
	0	55.8	+3.7	+25.5	25.77	.316	.311	.127	.419	.412	.168	6.09/	2.00Y	/5.97
Rhubarb extract	30	50.0	+3.3	+23.4	23.63	.254	.250	.098	.422	.415	.163	5.54/	2.14Y	/5.63
	60	48.3	+2.4	+22.3	22.43	.235	.235	.093	.419	.415	.166	5.37/	2.46Y	/5.36

TABLE II—J. H. HALE PEACHES: Color Changes During Browning of Frozen Fruit After 8 Months Storage at 0 Deg. F.

Antioxidant Treatment	Reaction Time In Minutes	Hunter's Readings			$\sqrt{a_L^2 + b_L^2}$	ICI Color Notations Tristimulus Values (1)			ICI Color Notations Trilinear Coordinates(2)			Munsell Color Notations		
		L	a_L	b_L		X	Y	Z	x	y	z	Value(3)	Hue (4)	Chroma (4)
	0	50.4+	3.5+	19.5	19.84	.259	.254	.134	.400	.395	.207	5.58/	1.35Y	/4.51
Check	30	46.9+	4.6+	18.5	18.60	.228	.220	.113	.406	.392	.201	5.24/	0.48Y	/4.49
	60	40.4+	4.6+	15.7	16.36	.170	.163	.085	.407	.390	.203	4.59/	0.32Y	/4.06
	0	50.2+	3.9+	20.8	21.16	.258	.252	.121	.409	.399	.192	5.56/	1.18Y	/4.92
Ascorbic acid	30	46.7+	2.4+	19.0	19.15	.220	.218	.108	.403	.399	.198	5.22/	2.27Y	/4.42
	60	43.0+	2.2+	16.8	16.95	.187	.185	.097	.399	.394	.207	4.86/	2.04Y	/3.97
	0	33.7+	5.9+	17.1	18.09	.202	.191	.099	.411	.388	.201	4.93/	9.43YR	/4.44
Sodium oxalate	30	40.4+	4.7+	15.6	16.29	.170	.163	.086	.406	.389	.205	4.59/	0.12Y	/3.98
	60	36.9+	4.8+	13.2	14.05	.143	.136	.078	.401	.381	.218	4.24/	9.78YR	/3.49
	0	45.0+	3.1+	18.8	19.06	.207	.203	.097	.408	.400	.191	5.06/	1.66Y	/4.55
Ascorbic acid and Na oxalate	30	42.8+	2.4+	18.6	18.75	.185	.183	.082	.411	.407	.182	4.83/	2.52Y	/4.56
	60	41.4+	1.3+	16.8	16.85	.171	.171	.085	.400	.400	.199	4.69/	2.88Y	/3.98
	0	51.9+	4.2+	22.1	22.50	.276	.269	.124	.413	.402	.185	5.72/	1.11Y	/5.28
Rhubard extract	30	44.2+	3.4+	18.2	18.52	.200	.195	.095	.408	.398	.194	4.97/	1.50Y	/4.38
	60	39.5+	4.2+	16.2	16.74	.162	.156	.076	.411	.396	.193	4.50/	0.85Y	/4.10

(1) $L = 100\sqrt{Y}$ $\quad a_L = 175\,(1.02\,X - Y)/\sqrt{Y}$ $\quad b_L = 70\,(Y - 0.847\,Z)/\sqrt{Y}$

(2) $x = \frac{X}{S}$, $y = \frac{Y}{S}$ and $z = \frac{Z}{S}$ $\quad (S = Z + Z + Z)$

(3) Calculated from Table II of Newhall, *et. al.* (Ref. 5, end of text)

(4) Calculated from Figs. 1-7 of Newhall, *et. al.* (Ref. 5, end of text)

the **RIGHT** horsepower
100 horsepower and smaller sizes

Every time on every application the power drive that is the best is the one that gives you the RIGHT horsepower, the RIGHT shaft speed and RIGHT where you need it . . . all combined into one compact power package.

Don't put up with makeshift assemblies when it's so easy to get a unit that's just right for each job.

Master Motors, available in thousands and thousands of types and ratings (up to 150 HP), give you an enormous selection of units designed so that they easily combine to give you a power drive that will add greatly to the compactness safety and economy of each job. Open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single

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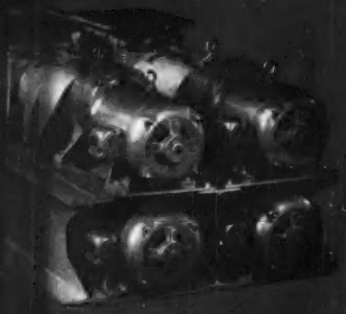
speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.



the **RIGHT** shaft speed
Gear reduction ratios up to 432 to 1

and **RIGHT** where you want it

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

berta. The white-fleshed Champion had very low amounts of the pigments.

Added ascorbic acid did not aid in retaining the carotenoid pigments in frozen peaches. During oxidative browning, the magnitude of changes was small and varied with different varieties, but was not affected by different antioxidant treatments.

Measurement of Color Changes

Colors and the rate of color changes during browning were measured by the Hunter Color-Difference Meter. Results were expressed in terms of three methods of color specification: Hunter's data, the I. C. I. and Munsell systems. Tables I and II represent the color data of the Redhaven and J. H. Hale varieties, respectively, and are given to illustrate the difference between two peaches of different browning tendencies. Chromaticity diagrams were made from both Hunter's data and the I. C. I. data for comparison, and are shown in Figs. 3 and 4.

As indicated in the literature, color is described by three independent attributes[6, 7, 8, 9]. In a psychological description, these attributes are hue, lightness or brightness, and chroma. The visual brightness of color is indicated by the tristimulus Y value in the I. C. I. system or the Munsell "Values", both corresponding to the Hunter's L readings. The I. C. I. x and y values, the Munsell hue and chroma or the Hunter's a_L and b_L readings designate color chromaticity.

The chromaticity diagrams of the samples showed that each variety had a definite color pattern. During 1-hr. oxidative browning, the colors changed little in chromaticity. Figs. 9 and 10 show the changes of the chromatic values of samples in Hunter's data during browning. The range of b_L values varied in different varieties, but all experimental samples were in the range of +15 to +26. In each variety, higher b_L readings corresponded to the initial colors of peaches after thawing, and lower readings indicated that discoloration took place.

A line could be drawn from the data for each variety to indicate minimum b_L readings for the desirable colors of that variety. Changes in lightness of colors of different samples also took place during the browning. This was indicated by the changes in the I. C. I. Y values or the Hunter's L readings. As the colors became darker or less bright, the Y values decreased and the difference in Y values of a sample during 1 hr. oxidation indicated the rate of browning or discoloration.

The rate of browning was influenced by both tannin and polyphenolase contents. Champion, J. H. Hale, and

Why compromise on QUALITY

WHEN BUYING PACKAGING MACHINES?

We have always felt that a package plays such an important part in SELLING that it deserves the very best. That means as near perfection in wrapping as it is possible to obtain. It means smoothly formed wraps, perfect sealing and proper handling of the wrapping material and product. Equally important, such perfection should be maintained whether production calls for only a small quantity or many thousands of packages per day. Notice, for example, the uniformly neat wrapping on leading cigarette packages, chewing gum, toilet soap, candy boxes, etc.—all of which are wrapped on PACKAGE machines.

Working to such a standard requires machines of high precision, constructed of the best materials. It requires many extra hours spent in designing by experienced and talented designers and engineers.

We also believe that to be a good investment, a wrapping machine should have a long life. There are, for example, PACKAGE machines that have been in service for over 20 years. Hundreds of manufacturers have found that machines built to these standards, though the initial cost may seem high, are far less expensive in the long run.

And to prevent early obsolescence as far as possible, PACKAGE machines are purposely designed to accommodate new improvements that we may make from time to time.

Today, maintenance of quality standards is more important than ever – in the packages you turn out, and in the machines you buy to do the job.

So remember, there are mighty good reasons why leaders in the package goods field have standardized with PACKAGE machines.

Put your problem up to "PACKAGE"

SOME OF THE MANY PRODUCTS WRAPPED ON OUR MACHINES

PACKAGE MACHINERY COMPANY

SPRINGFIELD, MASSACHUSETTS

NEW YORK · CHICAGO · BOSTON · CLEVELAND
ATLANTA · DALLAS · DENVER · LOS ANGELES
SAN FRANCISCO · SEATTLE · TORONTO · MEXICO D.F.

wherever you need stainless steel tubing...

TRY TRENTWELD!

● Stock lines in food, paper, and chemical plants; heat exchanger units in processing industries; cooling coils in breweries, beverage industry, dairies and dairy equipment... throughout all industry, wherever there's a stainless or high alloy tubing application, there you'll find TRENTWELD.

And it's to be expected! TRENTWELD is made in a tube mill by tube engineers who roll and weld stainless and high alloy tubing exclusively. Then too, TRENTWELD is available in a full range of sizes — 1/8" to 36" in diameter. This, coupled with Trent's convenient mid-continent location, means prompt delivery of what you want ...when you want it. If yours is a stainless or high alloy tubing requirement: Call on us.

TRENTWELD

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN

(Subsidiary of Crucible Steel Company of America)

Golden Jubilee varieties, all high in tannin and/or enzyme contents, had high rates of browning. Intermediate rates were found in Halehaven and Elberta peaches, both of which had medium contents of tannins and enzymes. Eclipse and Redhaven, both low in tannins and enzymes, had low rates of browning.

A significant correlation was found between the total tannin content in each variety and the percent tannins oxidized per hour. A correlation also was found between the total tannin content of each variety and the luminous Y values (Figs. 5 and 6). During the oxidative browning of frozen samples, there was a decrease in the I.C.I. Y values as the tannin content decreased.

It was observed that the chromaticity of different peach varieties under investigation was distributed on the chromaticity diagrams (Figs. 7 and 8) in such a manner as to indicate a definite relation to the total contents of carotenoid pigments of these varieties (Fig. 7).

References and Bibliography

1. Ponting, J. D. and Joslyn, M. A., "Ascorbic Acid Oxidation and Browning In Apple Tissue Extracts." *Arch. of Biochem.*, 19, 47-63, 1948.

2. Guadagni, D. G., Sorbe, D. G. and Wilbur, J. S., "Enzymatic Oxidation of Phenolic Compounds In Frozen Peaches." *Food Tech.*, 3, 11, 1949.

3. *Official Methods of Analysis.* Assoc. of Official Agr. Chem. 7th Edition, 1950.

4. Hunter, R. S., *Description and Instruction for Hunter Color and Color-Difference Meter*, H. A. Gardner Lab., Inc., Bethesda, Md.

5. Newhall, S. M., Nicherson, D. and Judd, D. B., "Final Report of the O. S. A. Subcommittee on the Spacing of the Munsell Colors." *J. Opt. Soc. Amer.*, 33, 7, 1943.

6. Belinkin, I. A., "Fundamental Approach To Color In Design," *Elec. Manuf.*, (The Gage Pub. Co.) Oct. and Nov. 1950.

7. Evans, R. M., *The Description and Specification of Color.* Tech. Assn. of the Pulp and Paper Ind. 126, 2, 1947.

8. Judd, D. B., "Hue, Saturation and Lightness of Surface Colors With Chromatic Illumination." *J. Opt. Soc. Amer.*, 30, 2, 1940.

9. Nicherson, D., *Color Measurement and Its Application to the Grading of Agricultural Products.* U. S. Dept. of Agr. Misc. Publ. 580, 1946.

10. Doesburg, J. J., "The Inhibition With Oxalate of the Oxidative Browning of Frozen Foods," *Mededel Dir Tuinbouw* 12, 2, 82-97, 1949.

11. Joslyn, M. A., "Color Retention In Fruit Products," *Indus & Eng. Chem.*, 33, 3, 308-14, 1941.

12. Kelly, K. L., Gibson, K. S. and Nicherson, D., "Tristimulus Specifications of the Munsell Book of Color From Spectrophotometric Measurements." *J. Opt. Soc. Amer.*, 33, 7, 355-75, 1943.

—End—

Continuous Control

—Continued from page 93

point in order to insure a uniform quality product.

Government Inspection

In addition to production line inspections, the plant makes a special inspection every half hour to test for blanching quality, color, texture, and crispness. The USDA inspector also makes tests, every half hour, of the product before and after freezing.

While field representatives of Bate-

Coming Features in FOOD ENGINEERING

Special articles emphasizing the "what, why, and how to do it" are scheduled for early issues of FE—all "engineered" to help you produce higher quality foods at lower costs. Here are just a few of them—

Engineering-Management Team Boosts Food Plant Efficiency

Non-Stray Quality Flavors

Builds Substantial Success in Novel Foods

Aluminum: Where It's Used and Why in Modern Food Handling

Big Beverage Success

New Churned Margarine Is Texture Triumph

Drying Centrally Controlled

"Shock" Treatment Solves Smoke Problem

Quality Berries by 4-Point Control

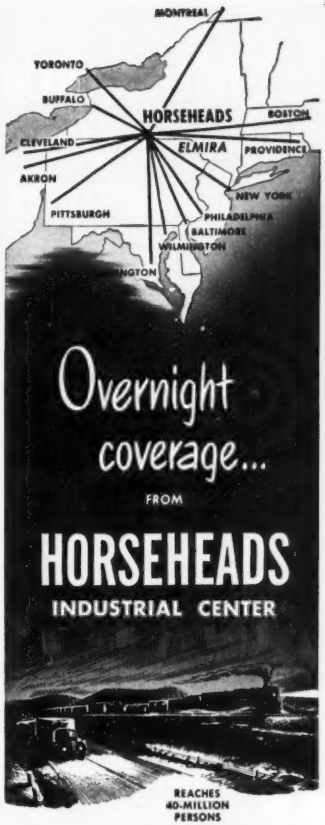
Sanitary Equipment and Plant Design in Flour Mill

Engineering Revolutionizes Beef Dressing Practices

Corn Products Plant Takes Waste Out of Waste Disposal

How Yogurt and Other Cultured Milks are Made

Advanced Technics in Confectionery Plant



New In-Transit Point East or West Offers Distribution Savings

Complete warehousing service now offered at Horseheads

- *Carloads in and out*
- *LCL consolidation*
- *Packaging, repacking*
- *Processing, bottling*

Horseheads Industrial Center is served by 30 truck lines and 4 railroads: D. L. & W., Lehigh Valley, Erie, Pennsylvania. *New construction* offered on low-rental basis, for storage, processing, assembly.

For full details, write:

LEHIGH-HORSEHEADS

WAREHOUSE CORP.

Horseheads, N. Y. or
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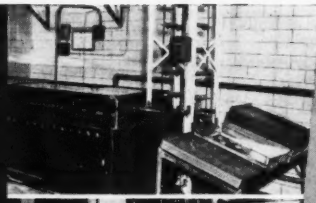
Volume Baking

at H. C. BOHACK CO., Inc.

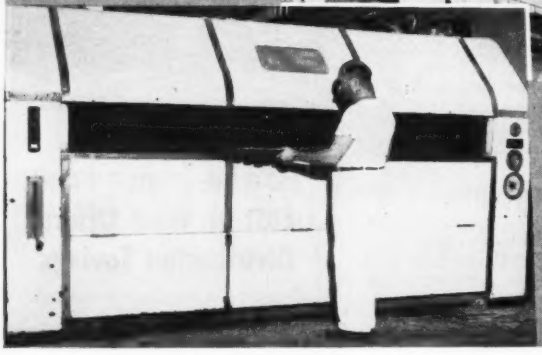
demonstrates versatility of GAS



1,000 dozen doughnuts a day are fried in the Jo-Lo Gas-fired fryer.

3 Fish Rotary Hearth direct Gas-fired ovens at Bohack. Baker loads one oven with pies—about 8,000 pies a week are baked here.

Bakers sprinkle flour on "Home Style" bread loaves prior to baking in the Gas-fired Baker-Perkins travelling oven.



Fifteen-tray Baker-Perkins Diathermatic Gas-fired oven bakes cakes and other sweet goods at H. C. Bohack Co., Inc.

Bakery staples at H. C. Bohack Co., Inc. of Brooklyn, New York, are baked in large volume with Modern Gas-fired Equipment.

250,000 loaves of bread a week,
8,000 pies a week, and
12,000 doughnuts a day

are examples, in addition to which cakes and other varieties of baked goods are prepared in quantity.

The Modern Gas Bakery Equipment at Bohack includes:

- Baker-Perkins direct Gas-fired travelling oven
- Baker-Perkins "Diathermatic" 15-tray Gas-fired cake oven
- 3 Fish Rotary Hearth Gas ovens for baking pies
- Gas-fired Jo-Lo Vitamatic doughnut fryer.

H. C. Bohack Co., Inc., is one example of how GAS serves the Baking Industry. Gas-baking gives the baker the temperature he wants—when he wants it, quickly. Gas is the versatile, modern, baking fuel, because GAS is clean, GAS is efficient, and GAS is economical. Find out the facts on Modern Gas Equipment from your Gas Company Representative. Call him today.

MORE AND MORE...
THE TREND IS TO GAS
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man give all assistance possible to help the growers to produce and ship the best okra, in-plant inspection and control of processing have also done much to raise quality and better the appearance of the product.

It is the improvement in operations that has enabled the plant to reduce its waste below the 4 percent mark.

Sanitation in the plant is under constant control. Three times daily all the tables and belts are scrubbed with a cleaning compound and the plant area is hosed down with a hot water chlorine mix.

End (Resume reading on page 94)

Top-Quality Poultry

—Continued from page 70

discharged as such into an ice bunker, from which the mobile icing tubs are filled.

Compressor requirements of the ice machine is 60 hp. The only other refrigeration need is for lowering the temperature of an emergency holding room, cooled by a compressor driven by a 30-hp. motor. Normally, birds are removed from the cooling tubs, packed in wood cases, covered with cracked ice, and immediately trucked to market.

New Type Dryer Aids Cutting

Current market demand is for an increasing portion of plant production to be packed as cut poultry, necessitating manual dismembering. This operation is performed along a stainless steel table with center conveyor.

Efficient dismembering of the birds and packing of the sections, either as all-legs, all-breasts, or as complete fowl, is best accomplished if the poultry, after final washing, arrives dry at the cutting tables. The in-transit drying method used at the Salisbury plant is an innovation in poultry packing procedure.

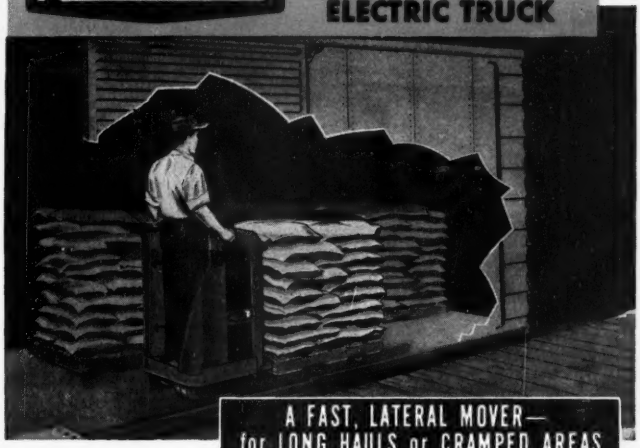
After washing, birds selected for cutting are transferred to the conveyor supplying the cutting tables. On it, the fowl are elevated to the ceiling of the plant, and there travel on a maze-like merry-go-round conveyor for draining and drying. Being located at the ceiling, the drain-dryer does not interfere with processing-floor traffic, nor occupy floor space needed for other production operation. Under the merry-go-round conveyor an extensive pan collects the drippings from the birds and discharges the run-off to the sewer.

When sufficiently drained and dried, the birds descend by conveyor to the cutting table for dismembering and packing into consumer packages.

End (Resume reading on page 71)

SPEEDS up to 6 mph

RAYMOND Low-Lift, Rider-Type ELECTRIC TRUCK



A FAST, LATERAL MOVER— for LONG HAULS or CRAMPED AREAS

Now . . . no more slowdowns on long hauls, stock picking, rail loading or unloading with the *RAYMOND* Low-Lift Electric Truck for single or double-face pallets.

This new *RAYMOND* Truck performs in narrow aisles and cramped quarters originally intended for hand lift trucks. It has the added advantage of high speeds plus riding comfort. It moves loads swiftly, smoothly up to 5 mph . . . travels up to 6 mph empty.

It's so maneuverable too . . . operates in truck trailers, boxcars, elevators and crowded production areas.

- **SPEEDS UP HANDLING** Features fast starting and stopping—short length—magic maneuverability. Speeds up long hauls, stock picking, loading and unloading.
- **ELIMINATES HAZARDS** Designed especially for riding comfort and safety. Operator rides in safe standing position, protected by metal guard. Result: safer handling, less strain and fatigue.
- **FAR MORE MANEUVERABLE** Has 200° turning radius—right-angle picks up and spots unit loads in aisles only 5 ft. wide, narrower than its own length with load.
- **OPERATES IN CRAMPED AREAS** Operates with ease inside truck trailers, boxcars, elevators—also in narrow aisles, crowded production areas.
- **SIMPLE TO MAINTAIN** All working parts are quickly accessible—major working assemblies easily removed from main unit for swift, simple bench repair.

SEND TODAY

RAYMOND Low-Lift Electric Truck. Model EL4F for single and double-face pallets. Capacity 4,000 lbs. Model EL4P for skid platforms.

RAYMOND

Electric Industrial Trucks
Hydraulic Elevating Equipment

The RAYMOND CORPORATION

Formerly LYON-Raymond Corporation

6262 Madison St., Greene, N.Y.

Gentlemen: Please send me Bulletin 750 on your new *RAYMOND* Low-Lift Electric Truck.

Name..... Title .....

Company.....

Street.....

City..... State .....

NEW PACKAGES & PRODUCTS

1

2

3

4

5

6

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8

9

10

11

12

Many Varieties of "Carry-Homes" Offered as Popularity Grows

Since Coca-Cola, one of the first pioneers of the "carry-home" pack, introduced its 6-bottle container, many new types have been put on the market.

Various reasons have been given for the increasing popularity of these packs for beer and beverages. In any event, brewing and bottling people have decided that they are here to stay.

With this acceptance and growing demand, brewers, bottlers and carton designers have combined their knowledge in an effort to secure cartons that are satisfactory to the purchaser, retailer, and processor. To satisfy these groups, various types have been designed. Pictured above are some of the packs now being marketed.

To win the customer, it was found that the cartons must (1) have attractive display and identification appeal, must (2) be convenient to carry, (3) sturdy enough to take normal han-

Key to Carriers Pictured Above

	Product of	Cartons by
1.	Old Reading Brewery, Inc., Reading, Pa.	American Coating Mills Div., Owens-Illinois Glass Co., Chicago
2.	7-Up Iowa Co., Des Moines	Gaylord Container Corp., St. Louis
3.	Pabst Brewing Co., Milwaukee	Morris Paper Mills, Chicago
4.	Gulf Brewing Co., Houston, Tex.	Container Corp. of America, Chicago
5.	Coca-Cola, Atlanta, Ga.	American Coating Mills Div., Owens-Illinois Glass Co., Chicago
6.	Lone Star Brewing Co., San Antonio	American Coating Mills Div., Owens-Illinois Glass Co., Chicago
7.	Orange-Crush Co., Chicago	Union Bag Co., New York City
8.	Storz Brewing Co., Omaha, Neb.	American Coating Mills Div., Owens-Illinois Glass Co., Chicago
9.	Necco Bottling Co., New York City	Empire Box Corp., Garfield, N. J.
10.	Anheuser-Busch, Inc., St. Louis	Schultz Folding Box Co., St. Louis
11.	P. Ballentine & Sons, Newark, N. J.	Container Corp. of America, Chicago.
12.	The Grapette Co., Camden, Ark.	American Coating Mills Div., Owens-Illinois Glass Co., Chicago

For More Data on Package Supplies Named Use Reader Service Card

For precision-engineered glassware
—ARMSTRONG

Our master craftsmen combine skill and experience in the production of these fine-quality containers. Paced by research and advances in glassmaking methods, they have developed containers that have improved performance on packing lines. Armstrong's Glassware is marked by uniform accuracy. These containers keep lines working smoothly . . . step up efficiency . . . reduce downtime to a minimum.

A representative from your near-by Armstrong office will be glad to give you further information about our complete packaging service. Chances are he can help you improve the appearance and performance of your container. Contact him today or write direct to Armstrong Cork Company, Glass and Closure Division, 4201 Prince St., Lancaster, Penna.

Packaging Headquarters for Metal and Artmold Plastic Caps, Corks, Crowns, and Du Pont "Cel-O-Seal" Bands

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IN SIZE REDUCTION

Rietz **Disintegrators**
For fine or coarse grinding, pulverizing, pulping. 360° screen in wide variety of sizes. Patented differential discharge.

Rietz **Prebreakers**
for preliminary size reduction operations requiring crushing and breaking of tough materials. *Rietz* BLOCKBUSTERS are used for frozen meat blocks.

Rietz **Thermascrews**
TL COOKERS: continuous screw-conveyor steam blanchers. TJ HEAT EXCHANGERS for heating or cooling; batch or continuous.

Equipment for the food and chemical process industries

Rietz
MANUFACTURING CO.
Santa Rosa, California

dling, yet (4) also be light in weight.

The retailer wants a pack that can be easily displayed, thus it must have good stacking features. He wants a design that will stimulate mass buying. Also, he prefers cartons that are easy to handle and store.

With the bigger demand in "take-home" business, the brewer and bottler are vitally interested in containers that can be automatically filled, easily stacked, loaded, and shipped, and stand repeated trips in the case of re-usable cartons. They want knock-down cartons that can be quickly assembled. Other important requisites are product protection and colorful identification of the product.

Two New Types of Cheese Offered

Two cheese products—one a Pilzner, the other an American cheese spread—have been introduced by The Borden Co., New York City.

The American cheese spread is a mild flavored product, particularly developed for those who do not like a pronounced cheese flavor. Portions in 1½-lb. amounts are packed in a cellophane-coated pouch, which in turn is placed in an attractive chipboard carton.

Frank Gianninoto Assoc., New York City, designed both the carton and pouch. Carton is manufactured by Cornell Wood Products Co., Milwaukee. And cellophane pouch is supplied by The Milprint Co., Milwaukee.

The Pilzner, a pasteurized process cheese spread, is a blend of soft ripened cheese and Swiss cheese. It is particularly recommended for use in canapes with rye bread or pumpernickel, and also as sandwich spread.

This cheese is attractively packaged in 6-oz. re-usable old-fashioned cocktail-type glasses.

Glass was designed and manufactured by Owens-Illinois Glass Co., Toledo, Ohio. Label is by U. S. Printing & Lithography Co., St. Charles, Ill. And Anchor Hocking Glass Co., Lancaster, Ohio, furnished the metal lid.

Ground Meat Carton

A stock carton for merchandising fresh or frozen ground meat is being offered by Container Corp. of America, Chicago.

Called the "Conecora Ground Meat Pak", the new package holds up to 1-lb. of meat. Separate label copy has been designed for ground beef and hamburger. The front panel provides space for display of dealer's name, retail price, and net weight.

The carton is made of white pulp board with a cellophane liner attached to the inside surface. A window cut-out on the front panel gives the product high visibility, while the liner affords protection from exposure.

"Pick-Up" Cocktail

A fruit drink, called "Selson Cocktail", enriched with Brewer's type yeast, has been developed by Orchard Products Co., Chicago.

The company states that the process imparts an appetizing fruit flavor,

(*Turn to page* 147)

Carrots tempting enough for dessert

Color like this—strikingly clear and realistic, perfectly reproduced by top label craftsmen! But with Muirson, you're sure of proper *follow-through*, too—because Muirson *specializes* in labels. They get designed, printed, and delivered *when you need them!* Worth investigating.

MUIRSON *specializes* in LABELS

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Again the time has come 1943 to ask your company, and every company, to

Get in the 1951 SCRAP

FOR every ton of ingot steel produced, at least a half-ton of iron and steel scrap must have *previously* reached the furnaces. Steel is currently being produced at full capacity, more than 100 million ingot tons annually—and there is a developing scrap shortage of serious proportions. Just as in the early years of World War II, the steel industry asks the help of *all* industry to relieve the situation.

TWO IMPORTANT THINGS TO DO

(1) CLEAN OUT YOUR PLANT SCRAP. This is a job that every company can do. Old, worn-out or out-moded and replaced machinery and equipment, rails, structural parts, etc. constitute the "heavy melting scrap" which the steel industry needs most. Clean up *your* plant and yards—move out this heavy scrap into the channels of use.

(2) HURRY BACK YOUR WORKING SCRAP. Don't let the waste of metal-working—turnings, borings, punchings, crop ends, etc.—lie around the plant a day longer than necessary. Keep it moving, back to the furnaces. And doubly important, *be sure to classify and segregate your alloy steel scrap.* Thus handled, it not only commands a higher price, but will help to conserve the nation's supply of critical alloys, practically all of which are highly essential.

Contributed in the National Interest by

ALLEGHENY LUDLUM STEEL CORPORATION

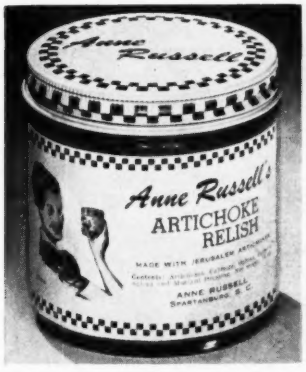
Henry W. Oliver Building • Pittsburgh 22, Penna.

masking any objectionable taste of the yeast. The natural B complex and vitamin A and C content adds enrichment to regular diets.

The product is sold in 5-oz. re-usable tumblers. To serve, it is necessary only to chill.

An attractive label design using applied color lettering is permanently fused on the glass.

Tumblers are supplied by Owens-Illinois Glass Co., Toledo, Ohio, and the vapor-vacuum seals by White Cap Co., Chicago.



Artichoke Relish

A specialty item, Artichoke relish, is being marketed by Anne Russell's Carolina Kitchen, Spartansburg, S. C.

The relish, a complement to meat, vegetable, and fish dishes, is made of Jerusalem artichokes, cabbage, onions, mustard sauce, and herbs.

It is packed in jars with a clean, fresh-looking green and white label, with closures in corresponding design.

Jars are furnished by Anchor Hocking Glass Corp., Lancaster, Ohio. Closures are by Crown Cork & Seal Co., Baltimore, Md.

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Proper pump selection increases efficiency and reduces costs of operation and maintenance.
Proper pump selection demands FREEDOM of selection for type, size, capacity, head, and other factors.
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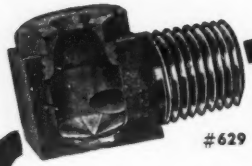
DEMING

THERE'S A MONARCH NOZZLE FOR EVERY SPRAY JOB



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Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

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if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

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Philadelphia 34, Pa.

Dates "Dress-Up" To Get That Eye-Appeal

Various companies are now marketing dates in attractive, eye-catching packages, as well as in containers designed for protection and ease in packing operations.

One type of package is the set-up folding carton designed and manufactured by Cleveland Cartons Div., Robert Gair Co., Inc., New York City.

Among companies using this type of package are W. H. Marvin Co., Urbana, Ohio; First National Stores, Inc., Somerville, Mass.; Clover Farm Stores Corp., Cleveland; and American Stores Co., Philadelphia.

The window carton with transparent overwrap is printed in multi-color in various designs. This style gives a very rigid package and, the overwrap, provides excellent protection.

Chocolate Drink for Export

To stimulate sales in Puerto Rico, The Borden Co., New York City, has specially designed a package exclusively for export of its chocolate flavored drink.

Called "Gudo", the gaily colored lithographed cans are designed to interest the youth market. White lines resemble the white cord around drums and can be re-used as a toy by children. The colors are orange, brown, and yellow on white, with the chocolate story told by the center bull's eye, which is in brown.

Package design is by Frank Gianninoto Assoc., New York City. Cans are supplied by American Can Co., New York City.

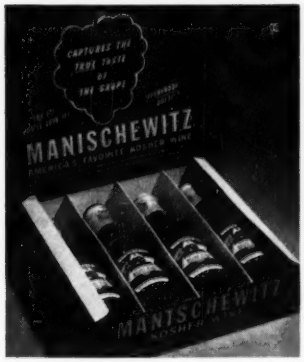
Redesigned Gingham Wrap

The standard gingham bread wrapper of the Interstate Bakeries Corp., Los Angeles, has now undergone a modification intended to raise its eye-stop appeal.

The wrapper features pictured slices of bread bursting forth from the wrapper itself. The reproduction gives a three-dimensional quality.

Waxide Paper Co., Kansas City, and Western Waxed Paper Co., Los Ange-

les, suppliers of the waxed paper, worked with the company on the design and successful use of the multi-colored photo reproductions.



Wine In Sample Box

A four-bottle pack of Manischewitz Kosher wine, in a distinctive display carton, is now being offered by Monarch Wine Co., Inc., Brooklyn.

Basically a "sample box", it is seen bringing sales stimulation. The box can be used by the retailer either for an assortment (such as Concord, Malaga, Blackberry and Loganberry) or for all one type of wine.

The carton is printed in the purple used on all Manischewitz advertising. A cut-out bunch of grapes on the lid of the carton makes an arresting counter display. The four 2/5 pt. bottles are neatly packed in separate compartments.

Cartons are supplied by Robert Gair Co., Inc., New York City.

Flavors and Colors:

—Butter chip candy, in pellet form, for use as flavoring in the manufacture of vanilla ice cream, by Mann's Candies, Los Angeles.

—Synthetic pineapple flavoring by Albert Albek, Inc., Culver City, Calif. Of use to candy manufacturers, bakers, ice cream and soft drink bottling companies.

—Powdered caramel color, a natural food product for coloring many types of dehydrated foods, such as powdered puddings, dehydrated soups, and other concentrated foods. Available through S. Twitchell Co., Camden, N. J.

—Maple flavoring, called "Imitation Maple Supra," by Samuel Klein, New York City.

—Butterscotch flavoring for candy manufacturers, from Magnus, Mabee & Reynard, Inc., New York City.

CM METEOR

● Heavy duty electric hoist for stationary, plain, geared or motor driven trolley suspension. Single and two speed models. Capacities: ½ to 5 tons.

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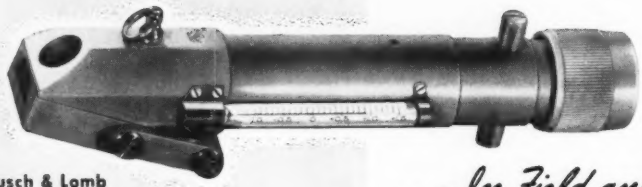
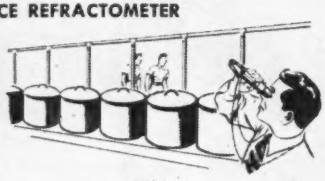
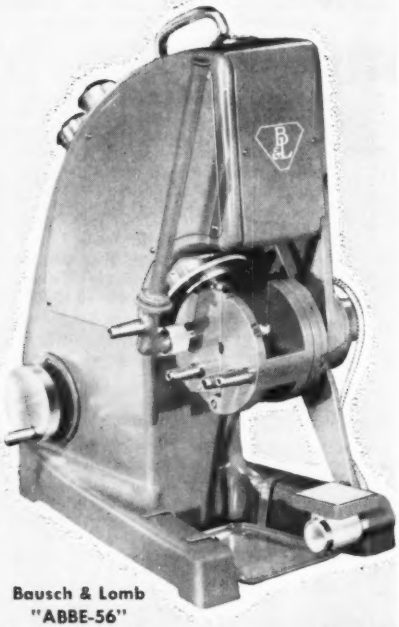


Bausch & Lomb
JUICE REFRACTOMETER





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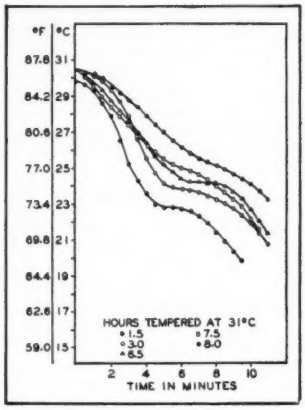
Write for complete information and a demonstration to Bausch & Lomb Optical Co., 603-13 St. Paul St., Rochester 2, N. Y.

Bausch & Lomb REFRACTOMETERS

ADVANCES IN TECHNOLOGY



Cooling Curves Determine Molten Chocolate Temper

A scientific method for determining the temper of chocolate which can be used as a simple, convenient, foolproof procedure for plant control in the confectionery industry has been developed. It involves measuring the rate of cooling of a sample at −70 C. This temperature is obtained with a dry ice-acetone mixture.

The cooling rate has 3 general phases. Initial drop is rapid followed by a reduced rate, which may even rise with very untempered chocolate, then the rapid rate is resumed. (See curves above.) As proper temper is approached (7.5 hr. at 31 C.) the slow rise occurs at a higher temperature and to a lesser degree. Over-tempering produces a curve that falls above the others.

Digest from "The Use of Cooling Curves as a Method of Determining the Temper of Molten Chocolate," by N. R. Easton, D. J. Kelley and L. R. Bartron, *Food Technology*, 521-23, Dec. 1951.

Vapor Barrier Packaging Preserves Chocolates

In a patented method of preserving chocolate candy by freezing, it is proposed to package the candy with an insulated vapor barrier that will permit freezing and thawing without the detrimental effects usually encountered in such treatment.

The candy is packaged in the usual manner, and the box is wrapped with a moisture-proof material which, when heat-sealed, forms an effective barrier against the passage of moisture. The box is then wrapped in a corrugated container and closed with gum tape. This provides the necessary insulation to retard freezing or thawing of the contents to the required uniform rate. It is claimed that such a package may be kept in a deep-freeze unit for long periods of time, and then thawed without mottling or change of color of the chocolate coating.

Digest from U. S. Patent 2,571,516, issued Oct. 16, 1951, on an application dated March 18, 1950, to F. J. Arnold, Chicago, assigned to Fannie May Candy Co., Chicago.

FATS & OILS

Synergists Plus Phenols Stabilize Fats In Foods

Hexametaphosphate and Maddrell's salt are effective antioxidants for foods in which fat is one component of a polyphase system. Their effectiveness is markedly increased by presence of small amounts of phenolic inhibitors such as BHA.

Evaluations were made of phenolic and synergistic antioxidants in an artificial aqueous fat system. Phenolic inhibitors included tocopherol, the gallates, NDGA and BHA. Synergists were: Polyphosphates, orthophosphates, citric and ascorbic acids.

Phenolic inhibitors were first tested in pure dry lard at concentrations of .005 percent. Order of their effectiveness was: NDGA, BHA, propyl gallate, lauryl gallate, and alpha-tocopherol. In contact with the aqueous solutions at pH 7.5, BHA was most effective.

Of the synergistic antioxidants in aqueous solution, hexametaphosphate and Maddrell's salt were most effective. Ascorbate accelerated rancidity with all inhibitors except NDGA, and polyphosphates counteracted this effect of ascorbate. Combinations of polyphosphate, ascorbate and primary inhibitors gave prolonged protection.

Digest from "Antioxidants in Aqueous Fat Systems," by B. T. Lehmann and B. W. Watts, *The Journal of the American Oil Chemists' Society*, 475-77, Nov. 1951.

Potato Slices Dipped In HCl Make Better Chips and Fries

Color of chips and French fries made from potatoes that have been stored at low temperatures can be greatly improved by soaking the slices in hot, slightly acidulated water just before frying.

In an attempt to eliminate conditioning (storage at 70 F. and 85 percent humidity for 1-4 weeks) numerous treatments were applied to slices of low temperature stored potatoes just prior to frying in peanut oil at 300-340 F. Dips of phosphoric acid, sodium bisulfite and HCl at various concentrations, temperatures and soaking times, and hot and cold water were tried.

Greatest improvement in color was obtained by soaking slices for 1-2 min. in 145 F. water acidulated with .044 percent HCl. Oil content of chips from treated slices was similar to those of untreated ones, and no acid was detectable in the chips or French fries.

Digest from "Improvement in the Color of Potato Chips and French Fries by Certain Precooking Treatments," by T. M. Whiteman, *Potato Chipper*, October 1951.

DAIRY

Custard-Like Evaporated Milk

Sweet coagulation of commercial evaporated milk is caused by a facultative aerobic spore-forming rod (*Bacillus subtilis*) that resists temperatures regularly used in the sterilizing process.

Spores of the organism show unusual heat resistance even in comparatively

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small numbers, and thermal death time data indicate that a minimum of 243 F. for 16.4 min. is necessary to eliminate spoilage.

Contamination is thought to originate in the raw milk. The organisms then multiply in the product and equipment as a result of faulty clean-up procedures.

Digest from "Thermal Resistance of a Facultative Aerobic Spore-Forming Bacterium in Evaporated Milk," by E. H. Ruyle and P. Sognefest, *Journal of Milk and Food Technology*, 173-75, Nov.-Dec. 1951.

Sundae Type Confection

A frozen stick confection which closely resembles, composition wise, an ice cream sundae is said to result from a recently patented invention. The product consists of a layer of ice cream or frozen custard and a layer of fruit ice, sherbet, fudge or frozen fruit with a dressing of flavored syrup deposed between the two. To attain essentially the same texture and melt down as ice cream, ingredients of the fruit layer are stabilized with colloids such as gelatin, pectin, or gum arabic.

The 3 ingredients in semi-frozen condition flow into molds and assume an undulated form as the result of their viscosities and overruns. This results in a wavy deposition of the dressing between the two layers of the confection, and assures uniform disposition. The finished product may have a sugar-water coating to prevent stickiness in handling and eating.

Digest from U. S. Patent 2,570,031, issued Oct. 2, 1951, on an application dated Aug. 29, 1949, to H. C. Gibson, Lancaster, Pa.

CEREAL PRODUCTS

Rice Vitamins Preserved By 3-Stage Process

Purpose of a recently patented process and apparatus is to treat rice in such a manner that the vitamins located in the silver coat, the outer cell layers, and in the germ, are diffused into the kernel and fixed therein by gelatinization of the starch. Crux of the process lies in careful control of the operations so that the most favorable conditions prevail throughout the 3 stages—soaking, steaming, and drying.

Apparatus for the 3 operations is similar, comprising a horizontal rotatable drum with helical conveyor blades secured to the inner wall. A stationary perforated central tube runs the length of each drum and provides means of supplying water, steam and hot air for each stage of the operation. All drums are open to the air at the discharge end, so that operations are con-

ducted at atmospheric pressure. The rice is conveyed through each drum from one step to another, and finally discharged in finished form.

In the soaking operation, temperature of water and degree of saturation of the kernels is closely controlled, so that the B-complex vitamins will diffuse toward the center of the kernel. In the steaming stage, starch in the kernels is gelatinized so that the vitamins are retained. Temperature is controlled to prevent destruction of vitamins. In the final step, the treated rice is dried by hot air as it is lifted by baffle plates in the drum and dropped through the current of air.

Digest from U. S. Patent 2,571,555, issued Oct. 16, 1951, on an application dated April 22, 1949, to D. S. Fernandes, Paramaribo, Surinam, Dutch West Indies, assigned to Vita-Rich Rice Process, Ltd., New York, N. Y.

BAKING

Changes In Starch Component Not Related to Bread Staling

Staling of bread represents a complex transformation which is not clearly understood, and it has been customary to evaluate the degree of staleness by measuring one or more of several progressive changes that occur on aging.

A number of instruments and procedures have been designed and used to determine crumb firmness and compressibility, crumbliness, water absorptive capacity, soluble starch extractable from the crumb, and the amount of amylose and amylopectin in the soluble starch. However, there is serious disagreement as to the validity of these methods.

Data show that soluble starch, whether determined as total soluble carbohydrate, soluble amylose or soluble amylopectin, cannot be related to the staling process. The possibility that some fraction of flour other than gluten or starch may have a restraining influence upon staling is a distinct possibility and is the subject of further investigation.

Digest from "Present Status of the Theory of Bread Staling," by W. G. Bechtel and D. F. Meisner, *Food Technology*, 503-5, Dec. 1951.

Imparting Cheese Flavor To Leavened Products

Incorporating leucine and amino acids in a conventional dough formula will impart a pronounced cheese-like flavor to bakery goods, according to a patented discovery. Leucine may be added to a conventional formula at either the first or second maturing points without significant difference in the final flavor.

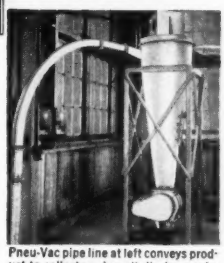
Because of the relatively small

A. E. STALEY MFG. CO. FINDS ANSWER to

Starch Conveying Problem

with

SPROUT-WALDRON PNEU-VAC SYSTEM



PROBLEM: To convey starch products from spray chamber to packing area. Capacity required—2000 lbs./hr. Products are hygroscopic, tend to pack and lump when exposed to high humidity air. The conveying system is used for several different products; must be self-cleaning to avoid hold-up.

OPERATION: Dried products are discharged from drying chamber through rotary feeder valves to a 4" stainless steel Pneu-Vac pipe line. The Pneu-Vac elevates material to cyclone collector which feeds scalping screen at packing station.

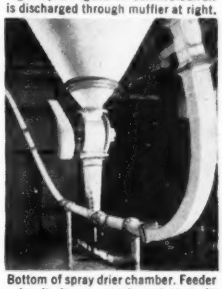
Conveyor air is filtered, dehumidified by cooling, then reheated to obtain necessary low relative humidity. Operational control of the entire system is completely automatic.

Dust which escapes the cyclone collector returns to the primary drying chamber.

RESULTS: Continuous removal of product from drier chamber is accomplished without danger of foreign matter contamination, or mixing of various products. Stainless steel construction insures product cleanliness. Loss of hygroscopic materials due to packing or sticking to conveyor surfaces is eliminated.

If you have a bulk materials handling problem, talk it over with Sprout-Waldron. PNEU-VAC may prove to be the most efficient solution. Write today to Sprout, Waldron & Co., Inc., 35 Waldron St., Muncy, Pa.

Pneu-Vac pipe line at left conveys product to collector where it discharges by gravity through feeder valve to screening and packing station below. Clean air is discharged through muffler at right.



Bottom of spray drier chamber. Feeder valve discharges starch products to 4" stainless steel Pneu-Vac pipe line.

Product from collector drops to vibrating screen and then to packing bin, from which it is drawn off in drums and multi-wall bags. Pneu-Vac pipe line carrying product from drier to collector is shown in upper left.

LOOK TO SPROUT-WALDRON for BETTER PROCESSING EQUIPMENT

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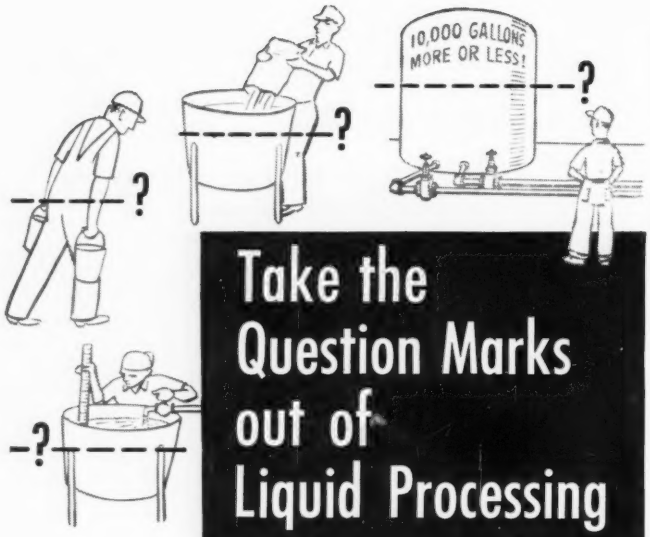

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amount added, it is possible to use leucine in any satisfactory baking formula. And it is not necessary to use an expensive purified crystalline product; hydrolysate of proteins relatively rich in leucine are equally useful, and in some cases superior on account of the additional pleasant flavor imparted. The acid hydrolysate of purified corn protein, zein, is particularly good.

Digest from U. S. Patent 2,564,763, issued Aug. 21, 1951, on an application dated April 27, 1946, to Peter Kass, Great Neck, N. Y., assigned to Interchemical Corporation, New York.

FERMENTATION

Yeast From Wood Hydrolysates Provides Low-Cost Protein

Methionine fortification of yeast grown on wood hydrolysates can provide a protein source comparable to animal protein. Without fortification, however, the protein in this yeast is poorly assimilated when compared with casein or brewers' yeast. This was evidenced when 6 strains of yeast known to thrive on the wood hydrolysate media were grown and tested on protein-depleted rats.

The yeasts utilized 90-96 percent of the reducing substances with yields of 42-58 percent yeast containing 45-51 percent protein. *Saccharomyces cerevisiae* No. 46 and *Tortula utilis* No. 3 had the highest protein contents and were the best sugar users. When fed to protein-depleted rats, weight regained was less for a yeast diet than for casein at the same protein level. Addition of methionine to the yeast diet made it equivalent to casein. Without methionine, brewers' yeast was superior to the wood-grown yeasts in weight-regain figures.

Digest from "Protein Evaluation of Yeast Grown on Wood Hydrolyzates," by E. E. Harris, G. J. Hajny and M. C. Johnson, *Industrial and Engineering Chemistry*, 1593-96, July, 1951.

MEATS

Thiouracil Fortified Rations Put Meat on Pigs Faster

Goitrogenic additions to rations of meat animals to reduce their metabolic rates and thus increase the ratio of weight-gain to feed-weight have been the subject of numerous experiments. In one such a project both paired—and *ad libitum*—feeding experiments were made on large white pigs about 12 weeks old and weighing 100 lb. Pigs receiving 0.1 percent thiouracil in their ration consumed significantly less feed per lb. of weight gained up to 210 lb. The weight was reached about one week sooner with a saving

of 45 lb. of feed (about 26 percent).

Feed saving over the weight range 100-210 lb. was greater, up to 25 lb. per head, but the time to reach the weight was greater. No significant effect was apparent on carcass formation, nor was there any evidence that the goitrogenic addition resulted in fatter animals. Iodine number of the backfat was not greatly different from controls. Actual composition of weight gains in the two types of animals was not compared, though other experiments have shown that there is no significant difference in amount of lean, fat, skin, and bone.

Digest from "Thiouracil as a Supplement in Rations for Fattening Pigs," by K. L. Robinson and W. E. Coey, *Journal of the Science of Food and Agriculture*, 365-71, August 1951.

BEVERAGES

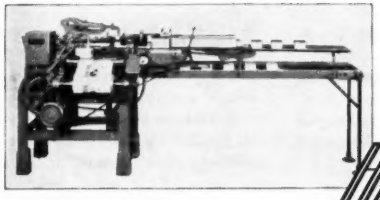
Filtration Vs. Clarification In the Brewing Technic

Use of centrifugal machines for clarification of beer has been practiced in Europe with varying results, most of them indicating that these machines are about as effective as filters but the beer may not be as chill-proof.

Recently a 3-month trial of an Alfa-Laval centrifuge at the De Gheest Breweries in Alost, Belgium, showed that such a machine will deliver a sterile product for packages—provided it has been first sterilized; that it is operated at the correct speed (6,000 rpm.); and that pressure on the beer leaving the separator is about 14 psig. Such beer could not be distinguished by taste tests from the doubly filtered product, though the clarity of the latter was slightly better. A centrifuge will reduce the turbidity of beer (11.6-12.9 deg. P. original gravity) from 0.130-0.180 Pulfrich units to 0.0014-0.0023 units, while filter-mass filtration will bring it down to 0.00072-0.0010. These figures were obtained at separator rates of 15-17 bbl. per hr. Final turbidity was somewhat higher when the throughput was doubled.

Centrifugal separation of beer followed by a single filter-mass filtration is an efficient practice, since it overcomes the tendency of pulp filters to deliver beers of increasing turbidity as their time in service increases. Even a double pulp filter removes very little turbidity from beer after 6 or 8 hr. of filtering, while the separator-filter combination will deliver beer of almost unchanged clarity for the entire period. Beer, either filtered or centrifuged, tends to increase in clarity (measured at 68 F.) for 2 hr. or more after filtering or centrifuging.

In bottles, equilibrium is reached



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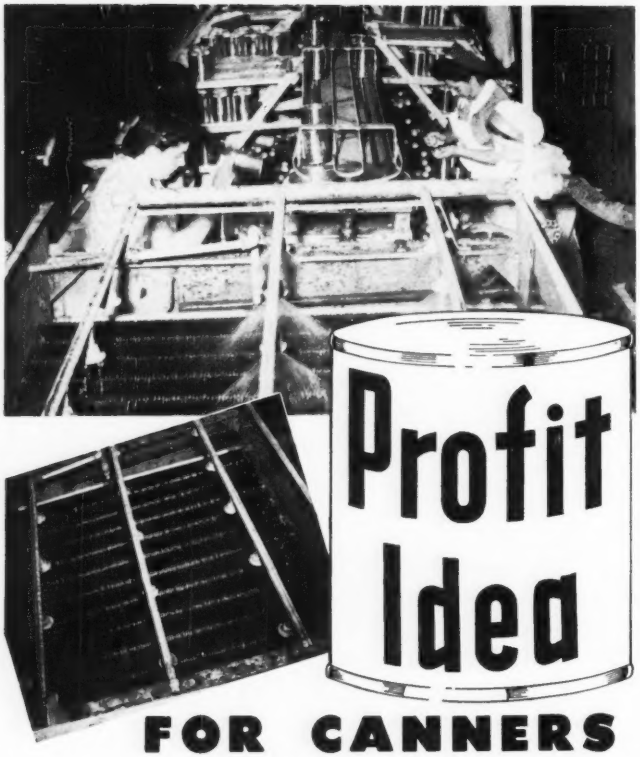

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The *Same* FULLERGRIPT BRUSHES
Clean *Different* Fruits and Vegetables

At the Hickmott Canning Co. in Antioch, California, apricots came in so soon after the asparagus season there was no time to set up new cleaning machinery. It was decided to run the apricots through the asparagus machine.

This idea worked. In the machine were Fullergript power brushes which imparted a very high shine to the apricots, so that brokers were "elated with the results".

The same Fullergript brushes *can* and *will* do a good cleaning job on different kinds of fruits and vegetables. You also want to remember that Fullergript brushes, which have their brush material anchored in a continuous metal channel, are much more dense, consequently serve you longer, at less expense.

If you are not enjoying savings that Fullergript makes possible, why not find out what Fullergript can do for you by writing to:

FULLER BRUSH
FULLERGRIPT
At home...in business, too

THE FULLER BRUSH CO.
INDUSTRIAL DIVISION
3640 MAIN STREET • HARTFORD 2, CONNECTICUT

after about 2 hr.; in open containers it may increase for 10 hr. or more. The phenomenon seems to be a function of the colloidal composition of the beer and the temperature of the storage.

Digest from "Clarification of Beer by Centrifugal Industrial Separators", by R. De. Wilde, *Echo de la Brasserie*, Vol. 7, No. 11, 281-87, March 16, 1951.

Sterilizing Beer Containers

Where bottled beer is not pasteurized, as in Germany and many parts of Europe, sterile filling should be practiced. For sterilizing containers just prior to filling, resort to overchlorinated water or SO_2 solutions is usually the practice.

Too much reliance cannot be placed on Cl in water for this purpose since, at the few ppm. usually found, long contact with the surfaces are necessary rather than the few minutes available in bottle shops or racker rooms. Phenol coefficient of Cl, using yeast as a test organism is about 65; that of SO_2 is about 25, indicating that the disinfecting power of Cl is about 2.6 times that of SO_2 and not several thousand times as has been reported.

Sulfur dioxide is a natural disinfectant for beer since it is a normal constituent of the beverage. Bottles are treated with 1.5-2.0 percent SO_2 solutions for 1-min., followed by draining and purging with sterile air or CO_2. Or, gaseous SO_2 can be introduced into the moist bottle from the washer for a brief period, followed by purging. Automatic machines for the purpose are available and can be introduced into the bottling line just ahead of the filler.

For bulk packages, introduction of 2 ml. of liquid SO_2 into a 50-l. cask (about 1.75 g. per ¼ bbl.) and allowing the cask to stand closed overnight, followed by rinsing and purging will sterilize the package effectively. Larger doses will have to be used if the exposure must be shorter. Automatic machines for handling the SO_2 in the racker room are available.

Digest from "Disinfection of Commercial Beer Packages," by Georg Gebhardt, *Brauwelt*, 593-98, July 19, 1951.

FRUITS AND VEGETABLES

Oxidation of Apple Juice

The indicator time test of Rothchild and Stone was applied to the study of oxidation of apple juice during processing and storage. Freshly pressed juice is highly oxidized, but becomes less so after clarification and filtration, and is lessened by preheating.

Clarified, filtered juice bottled by

cold sterilization oxidized severely after a few days storage, but became strongly reducing after long storage and sedimentation. Pasteurized juice behaved similarly but the oxidation rate was slower.

Removal of dissolved oxygen is difficult. An apparatus that removed 96 percent of the dissolved oxygen from water in a single stage at 120 F., removed only 89.5 percent in 3 stages at 180 F. At lower temperatures, or after long storage under CO_2, only about 50 percent was removed. The oxygen is apparently bound by juice colloids. Heat weakens the bond and increases the ratio of free to bound oxygen.

Digest from "Oxidation In Apple Juice. I.—Preliminary Investigation of the Relationship Between the Dissolved-Oxygen Content and Oxidation of Apple Juice During Processing and Shelf-Life In Bottle," "II.—Some Observations On Deaeration." by C. R. Marshall, *Journal of the Science of Food and Agriculture*, 314-27, July 1951.

MISCELLANEOUS

Tunnel Dehydrators Evaluated

Drying characteristics of counterflow, parallel-flow, and 2-stage tunnels for dehydrating vegetables are illustrated and compared by solving the same problem for each type of tunnel.

Conditions are specified for each experiment: Degree of dehydration, tray surface, weight of loading, air velocity, hot-end temperature, and wet-bulb temperature. Calculations are then made showing number of trucks in tunnel, drying time, output of dry product, proportion of air recirculated, heat required per pound of water evaporated and per hour, and wet-bulb depression at the cool end of the tunnel. The following general conclusions are drawn.

In the counterflow tunnel, drying air is introduced at the dry end, moving straight through the tunnel in a direction opposite to that of truck progression. During its passage through the string of trucks the air picks up moisture and becomes cooler. Thus the warmest, driest air is in contact with the nearly dry product, and the coolest, most humid air is in contact with the incoming wet material. This type of tunnel has the best drying conditions at the discharge end where the product is nearly dry. It can be operated, however, with light loading, so that reasonable good drying conditions will prevail also at the wet end.

In the parallel-flow tunnel, air moves in the same direction as truck progression. This tunnel is characterized by excellent drying conditions in that part where the material is still very wet. A very dry product can be

With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

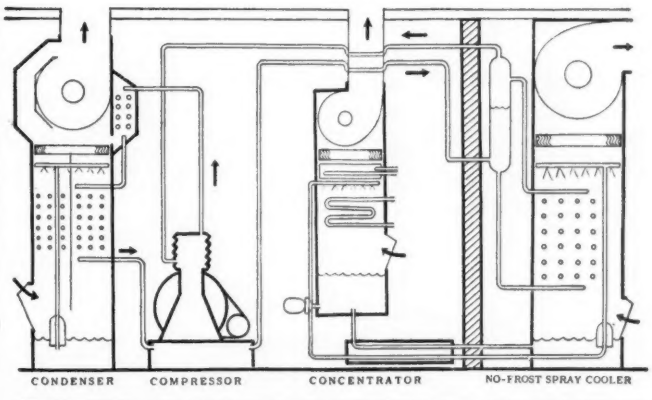
Now, a NEW design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature — not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. FI 405 Lexington Avenue, New York 17, New York.



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How to MAKE YOUR EQUIPMENT LAST LONGER

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Scientifically designed Oakite cleaners are safe to use. Each material is specially compounded for careful cleaning of all kinds of metals—copper, monel, stainless, aluminum. It's this combination of efficiency and safety that helps importantly in the preservation of equipment life.

SAFE Cleaning Counts HERE!

Oakite cleaning quickly removes tenacious food stains and soils, lime scale, rust, milkstone—without marring sensitive metal surfaces. Cleans baking tins without affecting burned-in surfaces. Derusts and degreases meat trolleys (500 at a time) without destructive tumbling. Descales heat exchangers chemically—eliminating harmful rodding procedures.

Arrange for In-Plant Tests!

Your local Oakite Technical Service Representative will gladly demonstrate safe Oakite Cleaning in action. Call him today . . . or write for interesting story "Cleaning in the Food Industry." FREE! Oakite Products Inc., 26G Thames Street, New York 6, N. Y.

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produced only if the tunnel is operated with poor heat economy. A high hot-end temperature can be used without damaging the produet, which makes possible a high evaporative capacity. The product will not shrink quite so much as that from the counterflow tunnel.

Two-stage tunnels, in which a parallel-flow wet end is followed by a counterflow dry end, combine the best characteristics of each—high wet-end evaporative capacity of the parallel-flow, with the good final drying of the counterflow. Good drying at both ends of the tunnel shortens the drying time and increases the output for a dehydrator of given size. This may be offset in part by the higher cost of construction and operation compared with a well designed counterflow tunnel.

In choosing a dehydrator design for a given operation, engineers will, of course, balance the advantages and disadvantages of the different types, and select the one giving the best overall technical and economic results. In this he will have the benefit of procedures, curves, and drying-rate nomographs already established.

Digest from "Tunnel-and-Truck Dehydrators as Used for Dehydrating Vegetables," by W. B. Van Arsdel, *AIC-308*, May, 1951, Bureau of Agr. and Ind. Chemistry, USDA, Washington.

New Whey Concentrator

An improved apparatus for concentrating whey and other liquid foodstuffs which requires less space, less critical material such as stainless steel, and is easier to clean than conventional evaporators, is the object of a recently patented invention.

The apparatus consists of a plate-type unit for heating the liquid and an evaporating receptacle mounted over it. The plate unit is comprised of three separate heat exchangers—a preheater for raising the temperature of the liquid to the evaporating point, a heater that maintains the temperature during evaporation, and a set of plates for condensing part of the steam from the evaporator. Evaporating steam is compressed by steam jets and is then utilized for heating in the first two sections of the plate unit. Surplus steam is condensed by water in the third section. Condensation of steam in the three sections produces the vacuum required to boil the liquid in the evaporator. Since the liquid leaving the evaporating receptacle is heavier than that entering from the heater, circulation is maintained without need for a pump.

Digest from U. S. Patent 2,562,739, issued July 31, 1951, on an application dated Aug. 8, 1946, to J. V. Marten Risberg, Ostertalje, Sweden, assigned to Aktiebolaget Separator, Stockholm.

That Handy Water Power

—*Continued from page 95*

the system is easily controlled. A hand-wheel, located by a window on the roll floor, is chain connected to the turbine and regulates its gate openings. This speeds or slows the water entering the unit, directly varying the rpm.

Location of the turbine speed control hand-wheel on the roll floor is strategic. A roll speed indicator within view from the wheel allows a direct trimming of the critical milling rpm. if it is necessary. And a view of the dam from the window allows an adjustment of turbine feed with river level.

Speed stability despite load variations is an inherent aspect of the water driven system. This is primarily due to the action of its 3-ton directly coupled pulley. Rotation of this heavy unit produces a flywheel effect, and fluctuations in load of 15 hp., more or less, have very little effect on speed.

When River "Acts Up"

Contrary to what one would think, there is only one time of the year when water motivation is apt to fail King Milling—high water time. For in the spring the Grand River, which drains the Flat, may swell to the point where it backs up and cuts the dam's hydraulic head to an ineffective 5 ft. or less. When this happens the water turbine can only partially power the plant and a stand-by electrical drive is thrown into service.

A 125-hp. GE motor provides this stand-by power. To throw it into action the power transmission system is momentarily stopped and a V-belt coupled to the motor. The sheaves on the permanent drive shaft are also sized for proper speed.

After the motor stand-by is hooked in, the hydraulic drive is again applied and the turbine gate wheel is rotated to its fully open position. This takes advantage of any water power that is available, and the motor—which runs continuously—merely takes up the slack due to the inadequate head.

Actually, the stand-by electric drive has only seen rare service. Water motivation has proven exceptionally constant, with little maintenance required. About the only spot in the system requiring attention is the turbine core wheel, which employs wooden cogs to prevent jamming hazards. However, these are easily and quickly replaced by one man.

Bearing and belting troubles have been few and far between. All-leather belting is used in long centers for the transmission of power. V-belts are employed in short centers between shafts. *End* (*Resume reading on page 96*)

Control Costs with TOLEDO

On your scale material becomes money!

PRINTWEIGH STOPS ERRORS . . . Provides printed weight records—at the instant of weighing—assuring that the accurate indication of the Toledo dial will reach your accounting records without chance of human error.

Modern Toledos meet your needs today for *rapid, accurate* scales in all phases of production . . . to help you *control costs!*

These are the scales backed by Toledo's half-century of experience in Research and Engineering that has produced 80% of the major advances in scales during this time.

Toledo engineering has not only specialized in the direct design of weighing machine mechanisms, but also in the many associated fields such as electronics, plastics, metallurgy, optics.

Check your needs *now*—select Toledo equipment for vital jobs in guarding materials and costs! Sales and service in 200 cities. Toledo Scale Company, Toledo 1, Ohio. We will be very glad to send catalogs.

NEW!
FLOOR SCALES
New recessed frame design fully guards against foreign material lodging beneath platform edge—choice of full or semi frame, with economical conversion for future needs. Double parallel link platform suspension means long life, accurate dependability. Send for bulletin 2406C.

TOLEDO

HEADQUARTERS FOR SCALES

"Largest Ready-To-Eat-Cereal Company in the World"

Modernizes with **DAY**

DUST CONTROL—MATERIAL HANDLING

From a small one-room corn flakes plant, operated by W. K. Kellogg, soon after the turn of the century, has sprung the Kellogg world wide ready-to-eat-cereal enterprise with plants in Battle Creek, Michigan; Omaha, Nebraska; Canada; Great Britain; Australia; South Africa and Mexico. Today, the Kellogg Company manufactures nearly a dozen different ready-to-eat-cereals, and in addition, dog, poultry and stock feeds. Kellogg products are known and distributed throughout the world, and the company has become known as the "Largest Ready-To-Eat-Cereal Company in the World."

In a recent modernization program at Kellogg's large Battle Creek, Michigan plant the DAY Company was selected to engineer, manufacture and install dust control, material handling and storage equipment. The total project included the following:

DUST CONTROL FOR CORN AND WHEAT CLEANING: A turn-key job which included DAY Type "AC" Dust Filters with proven dust collection efficiencies of 99.99% and better; the widely accepted DAY Dual Clone Dust Separators which assure maximum centrifugal dust separation, and DAY Exhausters designed for highest efficiency in dust control applications.

MATERIAL HANDLING: DAY self-cleaning Pneumatic Conveyor system was installed for fast, dust-free grits conveying.

CEREAL STORAGE: For use in the storage of Rice Krispies, DAY fire and vermin proof, non-bridging bulk storage bins were supplied. These bins are furnished in either heavy, galvanized black iron or stainless steel.

LEADING COMPANIES RELY ON DAY

Records show that most of the nation's leading millers and many food processors depend upon DAY. According to a national survey, DAY dust control equipment is the predominant choice, with DAY leading its nearest competitor in this field of dust control by a margin of 10 to 1.

DAY EXPERIENCE CAN SOLVE YOUR DUST CONTROL PROBLEMS

This achievement record, plus the experience gained by The DAY Company in engineering, manufacturing and installing dust control systems for food processing plants since 1881 is of great importance to you. It means that when you call upon DAY, you benefit from their 70 years' experience. No other dust control manufacturer can even approach DAY's accumulated knowledge in this specialized field. Regardless of your dust problem, DAY can provide an effective and economical solution. For engineering assistance and cost estimates, Write-to-DAY!

DAY SINCE 1881

The **DAY** *Company*

817 Third Avenue Northeast, Minneapolis 13, Minnesota
IN CANADA: P. O. Box 700, Ft. William, Ont.
Branch Plants in Fort Worth, Buffalo and Welland, Ont.

Streamlined Receiving

—*Continued from page* 102

the wooden dumping platform; and movement of the scale switch closer to the scale keyboard. Also, a vacuum sampler was installed.

Operating capacity was reduced about one-third by changing the crew size. However, in this plant the reduction in operating capacity did not lengthen the overall dumping period materially. Part of the time previously lost between trucks was merely absorbed, since the dumping period for each truckload of 100 cans was lengthened only 7 min.

Plant B, using a 3-man crew, needed a fast operating unit in the flush season, but did not require as much capacity at other times. This room was changed to permit operation by either one or two men.

Equipment changes comprised installing a vacuum sampler, and also building a larger dumping platform, a new sample tray rack, and a bracket to hold the weight sheets.

Labor savings were greater with one man than with a 2-man crew. However, reduction in operating capacity was thought by management to be prohibitive during the flush season. Milk arrived at a rate of about 20,000 lb. per hr. during a 4 or 5 hr. period. Management felt that it should be dumped at or above this rate. Yet, the 2-man crew was able to do this easily, and actually had a higher operating capacity than the original 3-man crew.

■ **Even if costs of making the changes in either of these plants had been several times as much, the labor savings would have offset them (see table). Volume of either plant could have been only a fraction of what it actually was and still the cost of change would have been justified. Labor savings in each plant offset the entire cost of change in a few months.**

Many plants can make similar savings. Others can make even greater ones. Producers averaged about two cans each in these plants. Larger producers would find a greater savings advantage in the improved arrangements than the specific two plants studied.

Both of these plants scheduled the crews for work in other departments when not receiving. Often, such extra time is wasted. A reduced crew would cut down that time in other plants, to make over-all savings greater than in Plants A and B above.

Concerns having less cleanup time than Plant A would also probably find greater savings.

End (*Resume reading on page* 103)

This Pfaudler "Lo-Vat" at the Louis Sherry plant is equipped with a bottom single-speed agitator drive. The agitator can be easily removed by simply lifting it off the center drive shaft.

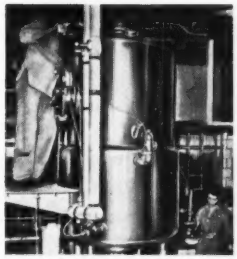
Automatic Control of Critical Temperatures Assures Quality of *Louis Sherry* Preserves

Maintaining premium quality is an important factor in the preserve packing operations of the Louis Sherry Company, Long Island City, N. Y.

To assure control of critical temperatures during a 90-minute holding period, a 300-gallon Pfaudler Pressure-Process "Lo-Vat" is used. Made of stainless steel throughout, the "Lo-Vat" is equipped with a solenoid controller linked to steam and cold water valves and engineered for fully automatic operation. All the operator has to do is pre-set the indicator and he is free to continue with other work.

Built with high-pressure jackets, Pfaudler Pressure-Process Vats are designed to permit heating with either steam or hot water. Fast cooling is obtained with chilled water. Also with Freon or ammonia, but not alternately with steam.

A sweep type stainless steel agitator in combination with an adjustable baffle provides thorough, but gentle, agitation of any food product. The Pfaudler "Lo-Vat" is available in 100, 200 and 300 gallon sizes. Larger Pfaudler Pressure-Process Vats are available with 500, 800 and 1000 gallon capacities.



PRODUCT QUALITY is also assured through processing Louis Sherry preserves in this stainless steel Pfaudler Vacuum Pan.

FOR FULL DETAILS on Pfaudler Pressure-Process Vats, just send us the convenient coupon.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Deaerators
Piston Fillers · Vacuum Pans
Steam Peelers · Evaporators

THE PFAUDLER CO., Dept. FE-1, Rochester 3, N.Y.
Please send bulletins checked below:
☐ Pressure-Process "Lo-Vat"; ☐ Large Pressure-Process Vat; ☐ Pfaudler Vacuum Pan.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

FOR lower production costs . . . stronger, neater closures . . . ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

Ask for Recommendations

UNION SPECIAL MACHINE CO.
450 N. Franklin St., Chicago 10, Ill.

Gentlemen: Without obligating me, please furnish information on bag closing equipment to handle the following production:

Kind of bags used? _____
Filled weight of bag? _____
Material being packed? _____
Maximum bags per minute? _____
Check-weighing required? _____
Conveyor required on Machine? _____
Power: ☐ D.C., ☐ A.C., Volts _____
Phase _____ Cycles _____
Name _____
Company _____
Address _____

Questions & Answers

THIS MONTH'S PROBLEM

Question—Our problem is making a line of aromatic fruit essences that will produce a stabilized, flavored syrup. Hence, we seek a typical formula for manufacturing such an emulsified product. Is there a stabilizing agent that we can employ to prevent separation of essential oil or fruit pulp from the syrup?

Answer to November Problem

The Question Was—A gelatinous sediment settles in our liquid coffee concentrate after it thaws. This gel formation does not alter the flavor of the coffee, but it does impair the appearance and the flow characteristics of the product. Our concentrate is a pure coffee with no added carbohydrates. And we attain our desired concentration of 24 percent solids by step-wise extraction. Can you advise us regarding the cause of this sedimentation and suggest a remedy?

Answer—The sediment "dropping down" in your coffee is proteinaceous. Nobody seems to know why it settles or how to prevent it from forming. It is quite possible that tannic acid reacts with this colloidal protein and causes it to precipitate.

Funny thing about this white precipitate is that you can reheat the coffee to get the precipitated protein back into solution. But you'll alter the flavor of the coffee. And then the protein precipitates after standing.

There are two factors that you might look into—i.e., the degree and temperature of extraction. If you make a brew and use it as a solvent in the extraction of another batch of fresh coffee, you'll build up the concentration of settleable proteins. And if you employ too high an extraction temperature, you'll break down some of the cellulosic substances in the bean, forming precipitable carbohydrates.

Permanent Welded Pipe Lines

Question—I have read with considerable interest your dairy plant article, "Permanent Welded Pipe Lines" (p. 74, Sept. FE). Can these welded fittings be purchased?

Answer—Contact suppliers of stainless steel pipes and fittings. They furnish the dairy industry with piping and fabricate the fittings. Most dairy stainless fittings are threaded so that the pipes may be screwed into them. There are also recessed-type fittings that are joined by silver-soldering.

Rodent-Control Tips

Question—Would you give us some practical ideas on controlling rodents in cold storage rooms?

Answer—Baiting with poisons is not recommended. This method requires careful supervision and confined baiting stations. And, in the case of the more common poisons, rodents usually do not consume enough bait to kill them.

Trapping is difficult because the materials are stacked close together and next to the walls. Thus, efficient placement and supervision of traps is almost impossible. What's more, frequent traffic for removal and stacking of raw materials results in tripped traps.

Poisoning by gassing with methyl bromide has been successful. Rodents are killed in 4-6 hr. by charging the room with ¼ lb. of methyl bromide per 1,000 cu. ft. But there are objections to using this gas. Being poisonous, it should be used only by licensed exterminators. Special equipment and preparation of the area are required, and care must be taken in the removal of raw materials from the room because of the deleterious effects of the gas.

Gassing the room with CO_2, in the form of dry ice, is effective, economical, and safe. The chore can be assigned to an unskilled worker, who should carry it out over a week-end or whenever the area is closed to traffic. Recommended is a dosage that will give a room atmosphere of at least 15 per cent CO_2 for 10-12 hr.

Of course, keeping rodents out of the plant proper is a primary measure. In this respect, the newer rodenticides, such as Warfarin, might well be considered.

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Fudge Formula Given

Question—We would appreciate it if you could furnish us with a formula and detailed steps in the manufacture of a quality fudge candy.

Answer—Actually, there are three major steps in the manufacture of a fudge candy—making the frappe, preparing the fondant stock, and cooking the fudge batch.

Frappe is added to fudge to make it light. Also, the invert sugar in the frappe formula keeps the fudge smooth and soft.

In making a frappe, cook 25 lb. of corn syrup to 245 deg. F. Turn off the heat and add 25 lb. of invert sugar. Transfer this syrup to a marshmallow beater. Start the beater and add an albumen solution (½-lb. of egg albumen in 1 lb. of water). Beat until light, and store in a covered, rust-free container.

Fondant is used to grain the fudge batch. It is made by cooking the following mix to 242-246 deg. F.: Granulated sugar, 50 lb.; invert sugar, 10 lb.; and cream (18-20 percent butterfat), 7 qt. The hot syrup is pumped into a cooling tank and then beaten after it has cooled to 125 deg. F.

Now to making the cooked portion of the fudge. Cook the following to 224-248 deg. F.: Sugar, 35 lb.; water, 6 lb.; corn syrup, 25 lb.; condensed milk (sweetened), 25 lb.; and edible oil (86-96 deg. F. melting point), 5 lb. After the batch cools to 190-200 deg. F., add the 60 lb. of enriched fondant and ½ lb. of salt and mix until the fondant is dissolved. Flavor as desired and 10 lb. of the frappe are added and, if desired, nuts may be included. Finally, the fudge is spread on oiled waxed paper to set.

In making a chocolate-flavored fudge, substitute 2 lb. of unsweetened chocolate liquor for each pound of hardened edible oil. Further, it is important to cook the batch 2 deg. F. lower than when making vanilla-flavored fudge.

Why Air-Conditioned Smoking?

Question—In catalogs received from equipment manufacturers, we have noted that air-conditioned smokehouses are now offered. Can you explain to us how the heat and smoke are supplied in this type of smokehouse? And what is the purpose of an air-conditioning unit in a smokehouse?

Answer—In these units, a smoke chamber, which is connected to the suction of a fan, circulates air through the smokehouse. The smoke chamber can be quite simple or somewhat intricate. A simple one consists of a metal container into which sawdust is manually introduced and then allowed to smoulder. A draft at the bottom, also manually operated, introduces sufficient air to keep the sawdust smouldering, but not actually burning. An intake at the top of the container introduces outside air, that then passes across the top of the chamber to carry the smoke into the suction of the fan.

One disadvantage of this type of chamber is the tarry substances and also ash particles are carried along with the smoke and introduced into the smokehouse. Furthermore, some of the tarry substances condense on the duct leading from the smoke chamber to the fan—constituting a fire hazard in the presence of any live sparks from the smouldering sawdust. To guard against this, a section of the duct is made removable, thus can be cleaned at frequent intervals.

Another method of overcoming this fire hazard is to install a water-mist spray in the outlet of the smoke chamber to wash out ash and creosote.

More intricate devices provide for automatic introduction of sawdust into the smoke chamber, temperature controls, and various methods of cleansing smoke leaving the chamber. Air in the smokehouse is heated by directing it over steam coils before circulating it through the house.

Actually, there is no air-conditioned unit in a smokehouse. Conditioning of air takes place in the smokehouse itself. In many cases, there is sufficient moisture released from the product to enable control of the relative humidity merely by regulation of the amount of outside air introduced. Control of both the dampers (in the outside air inlet and air-and-smoke outlet) is by means of a dry and wet-bulb thermometer.

Where the moisture from the product is not sufficient to maintain the desired relative humidity, additional moisture is supplied by steam-vapor inlets.

Re Frozen Concentrated Juices

Question—Please provide me with the answer to these questions: (1) What is the effect of temperatures above 45 deg. F. on the flavor of frozen concentrated orange juice? (2) What is the significance of the separation test on reconstituted frozen orange juice? (3) Why is the amount of pectin in such juices important from a packer's standpoint?

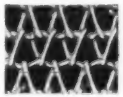
Answer—Assuming that you mean storage rather than processing temperatures, holding the juice at temperatures above 45 deg. F. would tend to accelerate deterioration of the product. And product deterioration would proceed more rapidly wth higher temperatures. Since the juice is not pasteurized, fermentation will take place. Eventually, the can will swell and finally explode. In addition to

Put the
FREEZE
On Freezing Costs
with a
CAMBRIDGE
WOVEN WIRE
CONVEYOR BELT

Whether you're freezing vegetables, meats or fruit products . . . in bulk or I. Q. F. . . . there's a Cambridge woven wire conveyor belt to help you cut freezing costs by combining movement with processing all along your production line.

For example, this photo shows a specially designed Cambridge belt carrying asparagus spears from a wash tank prior to freezing. Other belts may be used on inspection tables, in blanchers, on packaging and labeling machines, in freezer tunnels.

The moving belt eliminates manual handling, helps maintain product uniformity. All-metal construction gives longer belt life and lower maintenance costs. Open mesh of the belt provides free drainage of wash waters as well as free circulation of air in the freezing tunnel. Special side or surface attachments are available to meet individual requirements.



Cambridge Balanced Weave

Cambridge belts can be woven to any mesh or weave, from any metal or alloy, including stainless steel. Next time you have a conveyor belt problem, call in your Cambridge field engineer for his experienced advice. Write direct or look under "Belting-Mechanical" in your classified telephone directory.

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Or a basic spice seasoning such as Allspice, Cinnamon, Clove, Garlic, Nutmeg, Onion, Black Pepper...?

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fermentation, there will be off-flavors due to chemical changes in the orange oil.

The separation test is primarily used to determine if the solids in reconstituted juice will settle upon standing. Separation of the juice into a top watery and bottom solids layer is an indication of insufficient pectin in the product.

In short, too little pectin causes separation. On the other hand, too much pectin results in gelation of the reconstituted juice.

To Make Grapefruit Jelly

Question—Would you please let us have a formula and processing details for manufacturing a top-quality grapefruit jelly? What yield can we expect when using grapefruit juice containing 10 percent soluble solids?

Answer—Here's a formula you can use to produce an A-1 quality grapefruit jelly. Sugar, 100 lb.; grapefruit juice (10 percent soluble solids), 104 lb.; pectin (180-200 grade), 0.5 lb.; and citric acid, 0.5-2.0 oz.

Now to the processing details. Add juice and sugar to a steam-jacketed kettle. Heat to a vigorous boil, then introduce the pectin and citric acid. Continue cooking until the temperature of the batch reaches 221 deg. F., or a soluble solids reading (determined by refractometer) of 65 percent is attained. Turn off the steam and fill into jars.

Temperature of the jelly during filling should be approximately 200 deg. F. Chill the product to about 90 deg. F. by running the filled jars through a continuous spray cooler.

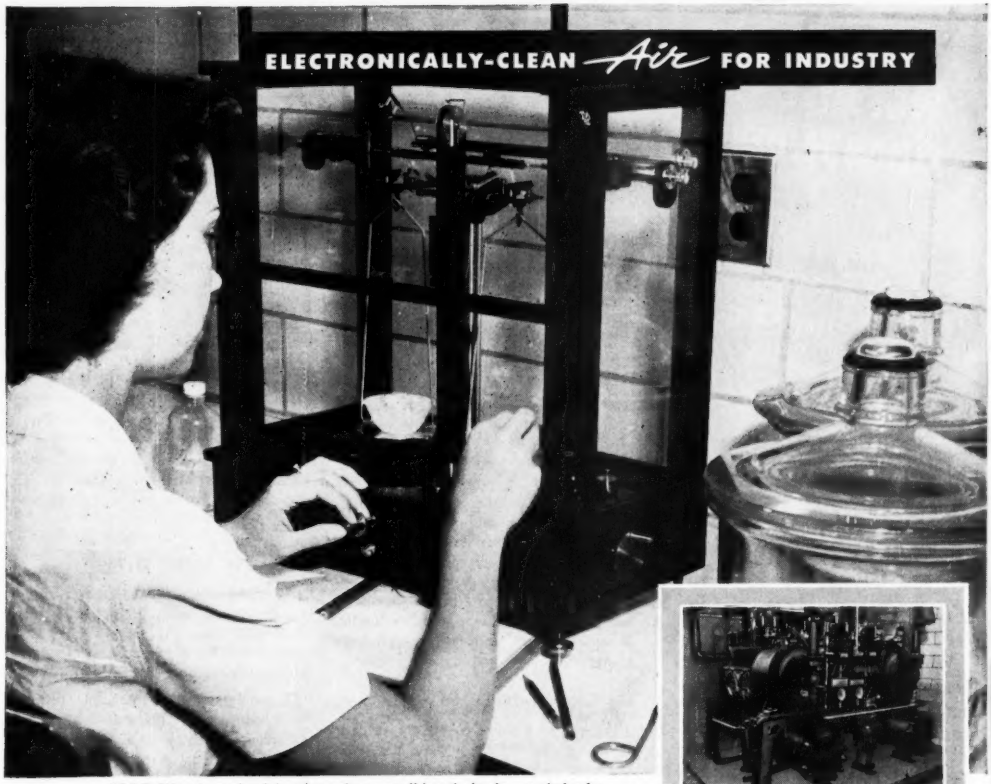
Such a batch will yield about 170 lb.

To Remove Water From Spinach

Question—Can you suggest a method of rapidly removing excess water adhering to spinach leaves after they have been trimmed and washed? We are prepacking the spinach in cellophane bags, and in a short time the bags become very foggy.

Answer—True, the water adhering to the leaves will condense on the inside of the bags, hence the need, as you say, for cutting down on the amount of moisture condensation by removing excess water adhering to the spinach.

To remove the water, we suggest that you pack the spinach in mesh bags, each holding about 25 lb. of product. Then place the bags in the bowl of a commercial laundry-type centrifuge (extractor), and spin for about 2 min. That will do the trick. And with less excess water, the shelf-life of the product will be extended.



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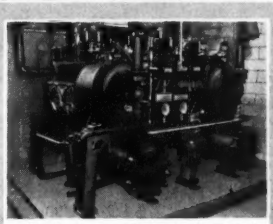

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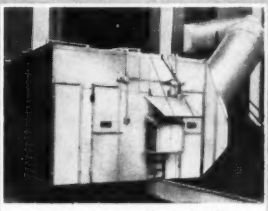

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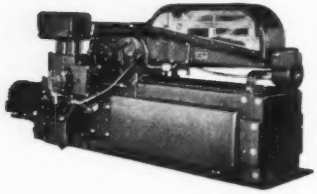

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ADVANCES IN ENZYMOLOGY, VOL. XII. *Edited by F. F. Nord. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y., 1951. 570 pages; 6¼x9¼ in.; cloth. Price $9.75.*

Rapidity in which enzyme technology is expanding has brought publication of this second volume for the year 1951 in what normally is a yearly series.

Probably of greatest interest to food men will be the chapters, "The Present Status of Starch Chemistry," by K. H. Meyer and G. C. Gibbons, and "Enzymes of Starch Degradation and Synthesis," by Peter Bernfeld.

Technics used for starch enzymes analyses are detailed, and a number of graphs illustrate typical results. A good bibliography (including foreign works) follows each chapter.

Subjects presented include biological methylation by molds, the specificity of certain peptidases, oxidoreduction in chloroplasts, and enzyme-substrate compounds.

On Grain Infestation

INSECT PESTS OF STORED GRAIN AND GRAIN PRODUCTS. *By Richard T. Cotton. Published by Burgess Publishing Co., Minneapolis, Minn. 1950. 244 pages; 5½ x 8½ in., paper. Price, $3.25.*

Identification, habits, and methods of control of the more common insects associated with grains is the theme of this handbook—written by the senior entomologist of the USDA.

Exacting a yearly toll of more than 300 million dollars in damages and expensive preventive measures, the insects involved are indeed pests of the greatest magnitude.

Detailed descriptions of the insects —origin, usual habitats, and actions— are followed by information on means for their elimination. Effects of the various chemicals used to prevent infestation, and the equipment adapted to handle them, round out the rest of the volume.

On Making Ice Cream

ICE CREAMS AND OTHER FROZEN DESSERTS. *By J. H. Frandsen and D. H. Nelson. Published by J. H. Frandsen, Amherst, Mass., 1950. 318 pages; 6¼x9¼ in.; cloth. Price $5.25.*

Here, the authors have compiled a practical, easily understood, yet scientific manual on the commercial manufacture of ice cream and frozen desserts. The volume is directed toward the plant-operator, but it can be used by students and salesmen as well.

The contents include reference material, formulas, solutions of plant problems, sales promotion ideas, data for calculating various mixes, and descriptions of the more important laboratory tests.

Several chapters are devoted to the engineering involved in making ice cream. The types and operation of freezers and packaging machines are discussed, along with the refrigeration equipment and technics used. Sanitation is covered in another chapter, where the relative merits of heat versus chemical treatment are evaluated.

Numerous pictures and diagrams illustrate the text.

Foods for Better Living

NUTRITION FOR HEALTH. *By Holger Frederick Kilander. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y., 1951. 415 pages; 6x8½ in.; cloth. Price $3.*

Importance of nutrition to our food habits is the theme of this volume. Written primarily as a text for high-school students, it consolidates much of our knowledge on developing sound, well-balanced diets.

Several chapters are devoted to commercial methods of food production and their relation to the health and safety of the public. In a 40-page table, more than 200 common food sources are summarized as to their nutritional content.

Each of the basic elements—carbohydrates, fats, proteins, minerals, and vitamins—are individually discussed as to source and metabolistic effects.

There are 125 illustrations and charts to help make the material quickly understandable.

Protein Know-How

PROTEIN AND AMINO ACID REQUIREMENTS OF MAMMALS. *Edited by Anthony A. Albanese. Published by Academic Press, Inc., 125 E. 23rd St., New York 10, N. Y., 1950. 151 pages; 6¼x9¼ in.; cloth. Price $4.*

Stressing limitations, as well as the technics currently employed in protein science, this volume discusses the amino compounds in relation to human requirements.

Six contributors from several prominent university and industrial research centers have cooperated in

discussing protein metabolistic theories, analytical technics, dietary aspects, and the needs of man.

Various food sources of proteins and amino acids are analyzed throughout the volume to explain how they affect metabolism. The influence of calories and vitamins on nitrogen-equilibrium in the body is also treated.

Evaluation methods are grouped together in a chapter by D. V. Frost of Abbott Laboratories, North Chicago. Both the older and more recent ways are presented, including the growth, method, nitrogen balance technic, and various biological assays.

Government Publications

RECOMMENDED SPECIFICATIONS FOR STANDARD PACKS, CONTAINERS, AND PACKAGING MATERIALS FOR POULTRY AND POULTRY PRODUCTS. *U. S. Department of Agriculture, Agriculture Handbook No. 25. Price* 40c. .Work in connection with the development of these standards has been conducted in cooperation with the Poultry Packaging Sub-Task Group of the Poultry & Egg Packaging Task Group.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

LARD MARKETING AS AFFECTED BY COMMERCIAL PROCESSING METHODS. *By Daniel D. Harlan, Production & Marketing Administration, Agriculture Information Bulletin* 53. *Price,* 15c. Describes processing equipment and methods, and emphasizes the effect of both on market acceptability of various types and grades of lard.

MAKING AMERICAN CHEDDAR CHEESE OF UNIFORMLY GOOD QUALITY FROM PASTEURIZED MILK. *By George P. Sanders et. al., Department of Agriculture, Circular* 880. *Price,* 20c. Describes modern cheese-factory practices, with recommendations for improving methods and notes on best types of equipment.

HIGH-DENSITY, FULL-FLAVOR APPLE JUICE CONCENTRATE. *By Roderick K. Eskew et al., Eastern Regional Research Laboratory, Philadelphia* 18, *Mimeographed Document AIC*-315. This report describes by flowsheet and text the equipment and methods recommended for a juice-concentrate plant. Cost estimates are included.

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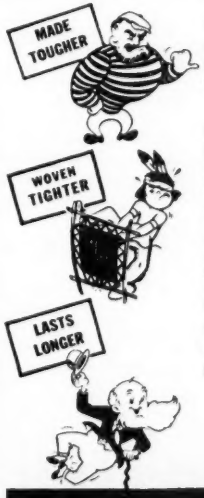

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Academy of Sciences Committee Says That Present Foods are Safe

"Contrary to some ideas, reliable food processors have not reduced the nutritional quality of our foods through the use of chemical additives. Actually, the quality and sanitary characteristics of our foods have been improving."

This is the categoric conclusion of Food Protection Committee of National Reasearch Council (an agency of National Academy of Sciences) in refutation of charges made before the Delaney Committee of Congress and publicized by various zealots.

"Likewise," continues the Committee, "there is no evidence that the use of the new chemicals in the processing of foods have created mysterious disease epidemics or endangered the health of people."

The Committee even says that poisonous materials are not necessarily unsafe—

"The fact that a chemical is toxic does not mean *per se* that its proper use as a chemical additive will entail a hazard. The distinction must be made between hazard and toxicity. Toxicity is the capacity of a substance to produce injury; hazard is the probability that injury will result from the use of the substance in the quantity and in the manner proposed."

But obviously the Committee does not want any heedless action by food processors.

This fact is brought out clearly in another sentence:

"Chemical additives should not be permitted in a food until their safety for a given food use has been established beyond a reasonable doubt, as judged by competent experts."

These and related topics will be the subject of an elaborate symposium under the auspices of Manufacturing Chemists Assn. in New York on Jan. 15, with F&DA Commissioner Crawford and other leaders scheduled to participate.

Spray Residues May Affect Quality of Canned Produce

Flavor ratings of canned foods containing certain spray residues may drop rapidly to the complete-spoilage level under certain circumstances—despite the fact that the original packed fruit quality rating was favorable.

On this question, a variety of exhibits were presented to the F&DA at one of its recent residue-tolerance hearings. Noted were instances of flavor loss in canned peaches, spinach, green beans, and apples.

Perhaps the most alarming fact in this evidence is that either a normal or very high score may be given to the canned goods when packed, and yet within a very few months a low rating may develop.

Among the insecticides considered were BHC (benzene hexachloride), Lindane, Chlordane, Parathion, DDT, DDD, and Methoxichlor. Off-flavors, and in some cases complete lack of flavor, developed during storage upon using them.

Generalization cannot yet be safely made as to what causes this shortening of shelf life and what can be done about it. But industry spokesmen privately admit that canners are considerably concerneed as to the commercial implications. They fear the very thought of complete packs coming back to them after having shipped best-quality products.

Aid in Potato Frying

It may soon be practical to use any variety of potatoes for making chips and French fries. A process developed by the USDA, involving dipping the raw slices in acidulated water, appears to be the answer.

At present, only certain potato varieties can be employed by commercial operators for chipping and frying. These two products, if made from unsuitable types or from potatoes stored too long, are usually too dark to be saleable.

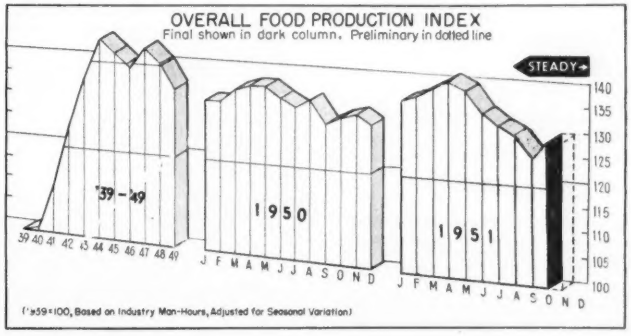
Laboratory tests at the USDA's Plant Industry Station, Beltsville, Md., indicate that such potatoes do not turn dark if raw slices are soaked in slightly acidulated water just before processing. Soaking time is about 2 min., with hydrochloric acid used to make a 0.04 percent solution.

Making Better Kraut

Careful control of product fermentation and rapid cooling of containers before storage are key factors in processing quality sauerkraut. So say researchers at the N. Y. State Agricultural Experiment Station, Geneva.

Poor grade kraut is dark in color and has an off-flavor—attributed mainly to undesirable yeast and bacteria growths, plus chemical changes in the fermenting vats. Vitamin C content also drops with darker color.

Warmer batches of fermenting kraut should be canned before those at cooler temperatures—thus holding down the wild reactions. For the same reason, the canned product should be cooled to below 100 deg. F. and stored at temperatures no higher than 70 deg. to insure retention of quality.



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To Survey Food Laws

Consideration of basic amendments to the Food, Drug & Cosmetic Act will certainly be on the docket for the session of Congress just opening. Final enactment of such changes is much less likely, but possible.

Chemical additives to foods will be the primary topic, with some amendment to the standards-making procedure also likely. However, this latter subject may be handled solely through administrative moves.

Delaney Committee proceedings will probably result in a report sometime this Spring. Its character is definitely uncertain, because some committee members appear far from convinced that witnesses' claims of public health hazard are justified.

If Chairman Delaney continues to press for radical recommendations, he may be confronted with a divided group of members. The report when made will likely ask for specific legislation. But this committee has no power for review or legislative recommendation—all House bills being handled by one of the standing committees. This will make for a slow start on the legislative procedure.

Industry and F&DA itself will both be heard from regarding wanted legislation. Already, the Manufacturing Chemists' Assn. has made a legislation draft, which it expects to release on Jan. 15. The proposed bill would require notification to the F&DA before new chemicals are used in foods (as proposed in a *Food Industries* editorial p. 89, Nov. 1950). Power of veto would be granted to the commissioner, but no formal approval would be required.

It appears that Commissioner Charles Crawford is little, if any, more radical in his views than are the leaders of chemical enterprise. It remains to be seen whether he and other officials will go along with the idea of the notification—and veto procedure, or will continue to press for the somewhat more rigid application and permit method of control.

Cooling Protects Grains

Surface molding on stored grains can be prevented through forced, cool-air circulation. Thus, spoilage, developing from uneven bed temperatures during the fall and winter, no longer need be considered a necessary loss.

Storing grain or corn at safe moisture contents is not a guarantee against surface spoilage. The coldest part of the bed can pick up moisture from the warmer part through the setting up of convection currents. Water vapor leaves the warm section, usually near the center of the bed, and moves to the outside and condenses on the colder grain. The moisture content of this grain may then be increased beyond the point of safe storage.

Experiments by the U. S. Department of Agriculture, in conjunction with several Midwest state experiment stations, have proved that low-velocity cool-air forced through the grain controls moisture migration.

Biological Waste Control

There has been a rapid gain in biological treatment of industrial food-plant wastes. A recent survey of almost 350 plants of all types in the U. S. showed that 26 were actually using biological oxidation—the greater share of these being engaged in food manufacture.

Food Index Breakdown

How did the various branches of the industry fare, productionwise, during the past year?

FE editors have now compiled the accompanying table to show average industry branch figures making up the Food Production Index, found monthly in first page of "Keeping Up With the Field" (this section).

The '51 figures do not indicate any drastic changes from the production levels of 1950—except for an 11.6 percent drop in butter manufacture (which was offset by a 10.4 percent increase in margarine).

All figures are based on industry man-hours, adjusted for seasonal variations—1939-100.

Item	1950 average	1951 average—estimated	Percent change
TOTAL FOOD	132.3	134.5	+1.7
Cheese	166.2	165.1	−0.7
Bakery Products	125.1	125.6	+0.4
Meat	147.5	150.0	+1.7
Canning & Preserving	151.2	156.0	+3.2
Wheat & Flour	110.7	112.0	+1.2
Butter	78.2	69.1	−11.6
Evaporated Milk	136.9	137.6	+0.5
Ice Cream	178.7	188.3	+5.4
Sugar	103.8	96.0	−7.5
Confectionery	131.9	131.2	−0.5
Malt Beverages	164.2	161.6	−1.6
Margarine	308.7	340.9	+10.4

Speeds Pineapple Planting

Putting in the "slips", a tedious, back-breaking task in pineapple planting, may soon be mechanized by units developed from this experimental machine. Hawaiian Pineapple Co. has successfully planted 30 slips per minute, two rows at a time, using this model. Four men, however, are required to operate it. Unit opens furrows, closes them after the slips are planted, and also lays the mulch paper necessary to hold moisture in soil. An International TD-6 tractor furnishes the motive power.

These figures were included in an address by Dr. Wiliam Rudolphs of Rutgers U., before the recent annual meeting of The American Institute of Chemical Engineers in Atlantic City, N. J.

Three interrelated factors govern the biological reduction (both anaerobic and aerobic) of B.O.D. (biochemical oxygen demand) in waste streams. These are food, organisms, and environment. Since microorganisms involved in the biological treatment obtain their food by diffusion through cell membranes, only soluble carbohydrates are readily available for digestion. Non-soluble material must first be hydrolyzed.

Nitrogen and phosphorus are essential to proper operation of biological beds and filters. The ppm. ratio of nitrogen to B.O.D. should be 1 to 20, while phosphorus to B.O.D. should be 1 to 75. Both materials may be added simultaneously by using ammonium phosphate.

As to organisms, the greater the number and variety, the shorter the time required for cutting B.O.D. Certain strains are better adapted to specific types of waste and should be cultivated by a survival-of-the-fittest elimination.

Temperature and pH are the most important environmental factors: The higher the temperature the better—up to a limit (which has to be deter-

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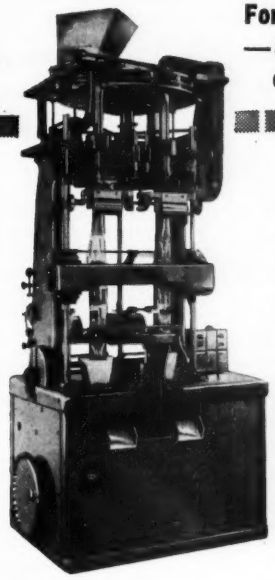

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TIME One Transwrap can automatically *form, fill, seal and deliver* 216,000 packages in an around-the-clock, 24-hr performance! This high-speed dependability is why more Transwraps were used in WW2 govt packaging—and are again, in today's emergency.

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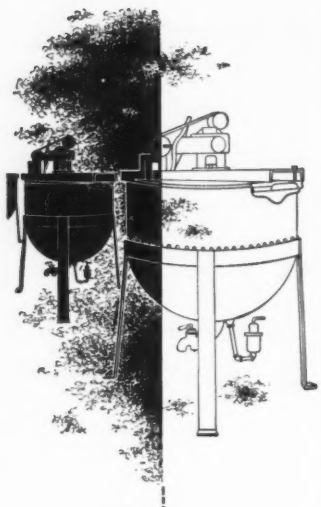

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The answer to easier clean-ups is a simple five letter word, M-E-T-S-O. Try it and know how fast Metso acts on dirt and grease films; how effectively it holds the dirt suspended. Then see how it all rinses away, leaving clean, greaseless, bright surfaces.

You will agree that clean-ups are easier with Metso Detergent. It's the right combination of alkali, controlled by soluble silica that increases the rate of dirt removal, yet curbs corrosiveness.

Mail the Metso trademark below, attached to your letterhead for a 16 oz. free sample of Metso.

Philadelphia Quartz Company
1148 Public Ledger Bldg., Phila. 6, Pa.

daily clean-up is **easy thorough on schedule**

METSO

metso *cleaners*

mined for each set of conditions). And pH should be between 6.0 and 8.0—adjusted if necessary. Aerobic digestion requires an ample supply of air, while anaerobic treatment calls for inoculation of fresh waste with fully digested residual matter.

Biological treatment can be commercially accomplished using both flocculent growths (such as activated sludge, low and high rate trickling filters) and non-flocculent growths (sand filters and dispersed growths).

Sets '52 Agricultural Goals

Total farm production for 1952 is expected to be 4 percent higher than 1951 and 50 percent greater than the prewar average.

The Department of Agriculture recently announced crop goals needed to meet our overall requirements—thereby giving us a record-high agricultural production year. Feed grains are particularly in demand, and farmers are being asked to give corn and grain sorghums prior claim over all less-productive grain crops.

Here is listing of individual crops on 1951 comparison basis:

Crop	'52 Goal (Percent of '51 Production)
Corn	109
Sorghum-grain	120
Soybeans—beans	99
Cotton	102
Potatoes	104
Sweet potatoes	154
Dry edible beans	107
Oats	99
Barley	114
Wheat	117
Rye	88
Rice	93

Quick Syrup Analysis

Rapid, accurate determination of sugar fractions in corn syrup are reported with a new selective adsorption procedure. Developed at the National Bureau of Standards, technic separates dextrose, maltose, and dextrin from a bed of carbon.

The syrup is first passed through a column filled with equal weights of carbon adsorbent and diatomaceous earth. Then sugar fractions can be selectively removed by successive pressure washings. Water removes dextrose; 5-percent ethyl alcohol washes out maltose; and 15-percent ethyl alcohol takes out dextrin.

Each of the three washings is evaporated under vacuum, and the residues are quantitatively analyzed either by polarization or chemical procedures. Reproducibility of 1 percent is stated attainable with the NSB method. Sugar recovery averages 97 percent, experiments indicate, necessitating use of a correction factor.

The apparatus required for the method is simple. A glass column with connection to a nitrogen pressure tank is the key equipment. The nitrogen provides pressure to increase the rate of liquid flow through the adsorbent.

Clarifying With Froth

Gross flotation is seriously being considered by a number of food plants for the complete recovery of finely divided, suspended solids from effluent waters. In the process, solids (usually in a colloidal suspension) are floated to the surface—being entrained in a froth—and skimmed off.

These facts were mentioned by Dr. C. C. Dewitt of Michigan State College in a talk before the recent annual meeting of the American Institute of Chemical Engineers in Atlantic City, N. Y.

The usual mechanical means of separation, centrifuging, screening, and filtration are generally unsatisfactory with colloidal suspensions. Gross flotation (either large-scale or pilot plant) has been successfully adapted to these problems:

Concentration of citrus pulp; recovery of fish protein; hydration of fruit skins, seeds and stems; removal of grease from packinghouse wastes; removal of solids from beet sugar waste waters; separation of starch from water; taking out stillage solids from winery waste water; removal of fines from fermentation slops; separation of albuminoids from beet and cane sugar; and removal of fine solids from sewage.

There are several companies offering commercial machines for gross flotation, but the principle of operation is the same in all. Air is first aspirated into the suspension, then addition of a chemical flocculant follows. The air is then quickly withdrawn—either by releasing hydraulic pressure or by pulling a vacuum on the suspension. Colloidal solids are drawn to the liquid surface by the air-bubble formed froth.

The Bulkley-Dunton Pulp Co., the Dorr Co., and the Sveen-Pederson Sales Co. are among those offering industrial equipment of this type.

3 Points on Fish Rancidity

A recent series of experiments, sponsored by the Pacific Coast Stations of the Fisheries Board of Canada, indicate:

1. Ascorbic acid treatment before storage definitely reduces the possibility of rancidity in fish. Also, a 0.3 percent ascorbic acid solution plus 0.5 percent thickener (like carrageen) is superior to a 1.0 percent acid solution.

2. The lower the storage temperature, the less rancidity.

3. Post-mortem age of the fish at the time of freezing does not affect the antioxidant efficiency of ascorbic acid.

Fresh, dressed red spring salmon were used in the tests. The steaks were stored in cracked ice for ½, 4, and 6 days before freezing to check the post-mortem age factor. Freezer temperatures were 14, −4, and −18 deg. F.

Pilot Fruit Waste Recovery

An improved technic for recovering feed-grade byproducts from fruit cannery wastes is indicated from pilot-plant work at San Jose, Calif.

Developed primarily to handle pear waste, the process is continuous. Of particular significance was the building of two special pieces of equipment —a unique dejuicing press and a continuous treater.

The press is designed to take advantage of the natural separation of juice and pulp, which occurs when gelled cannery waste ages. The unit first allows juice to drain free, then presses the remaining solids. Liming and heating are accomplished continuously, prior to pressing, in the custom-built treater.

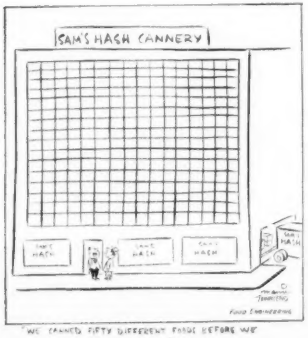
The project is jointly sponsored by the Canners League of California and the Western Regional Research Laboratory.

Editor's note: Complete details of the process will be forthcoming shortly in a feature story in FOOD ENGINEERING.

Identify Wild Yeasts

Yeasts, contributing to sub-standard cucumber fermentation, have been isolated at the Raleigh field station of the USDA's Southern Regional Research Station.

In studying over 1440 cultures, the Raleigh workers found that *Torulopsis* and *Brettanomyces* predominate in causing bloaters, or hollow cucumbers,



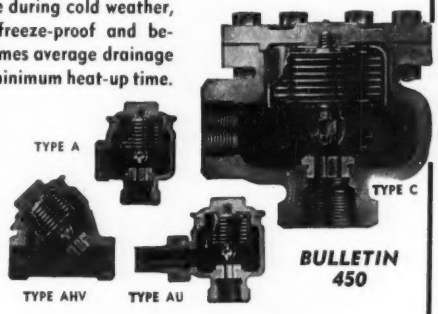
"WE CANNED FIFTY DIFFERENT FOODS BEFORE WE CONSOLIDATED."

NICHOLSON MAKES

Freeze-Proof Steam Traps

for Every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air-binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Sizes ¼" to 2"; pressures to 225 lbs.



BULLETIN 450

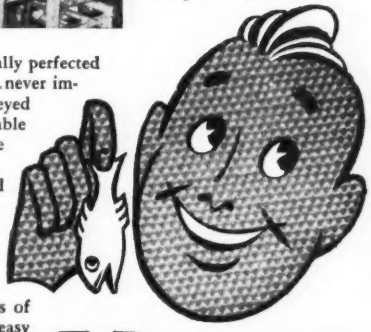
193 OREGON ST., WILKES-BARRE, PA.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

SUPRENE BELTING

Helps Food Stay Wholesome



Suprene Belting has been carefully perfected to help foods stay wholesome...never imparts any taste or odor to conveyed products. Made of tough, durable duck and impregnated with the exclusive Victor "Neoprene" compound, Suprene has proved of inestimable value in the packing, processing and manufacture of food products.

Suprene Belting is not only waterproof, but is also highly resistant to the injurious effects of fats, greases and fruit acids. It is easy to wash with steam or hot water. Specify Suprene Belting for all your conveying needs and be sure of safe, sanitary conveyance for years. Send for bulletin 20—it's free.

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1. 22 leaders of the FOOD industry tell the inside story of successful food marketing, in this book. They separate this complex industry into its most easily understood working parts, describe them accurately, and show their problems, practices, and relations one with the other. Invaluable for those interested in both the operating and the broader aspects of the present-day miracle of food distribution. **Edited by Paul Sayres, President, Paul Sayres Co., Inc. 340 pages, $5.00**

PLANT ENGINEERING HANDBOOK

2. Gives the facts which literally show how to run a plant today—any industrial plant—efficiently and economically. Provides not only an unequalled amount of reference material but also basic treatises to help you develop a broad background. Answers questions on the economic, mechanical, chemical, and power operation of a plant; gives essentials of good practice in 76 major areas of plant operation and maintenance. **William Staniar, Ed-in-Chief. Prepared by more than 80 specialists. 1955 pages, 1406 illus., 544 tables. $15.00 (Available on terms).**

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with subsurface fermentations. The first strain is more active during the initial 30 days of fermentation; the latter more active during the later stages.

Besides the subsurface yeasts, a second class of yeast is associated with fermentation brines. They are those that produce luxuriant films on the brine surface—thus cutting the efficiency of the process. The research group has isolated *Debaryomyces* as the main offender.

Tomato Juice Quality

Consistency of tomato juice appears to be primarily a function of preheating temperature before finishing, the finisher operation, and homogenization. These conclusions have been drawn by researchers at the N. Y. State Agricultural Experiment Station, Geneva.

Maximum gross viscosity and higher yields are obtained when tomatoes are preheated to about 160 deg. F., though the serum viscosity at this temperature is a minimum. Least settling of solids also occurs at this point. When finishing at 200 deg. F., the overall juice consistency remains high and serum viscosity is raised, but yields drop. Final juice color is not noticeably affected by varying the preheating temperature.

Increasing finisher speeds resulted in higher yields and raised both the gross and serum viscosity. Mold counts, however, also increased.

Use of vibratory screens, homogenizers, and deaeration, also different finisher screens, did not have any significant effects on color of tomato juice. Pasteurizer time-temperature relationship appears to be the critical variable in obtaining good color.

Maraschino-Style "Crans"

Cranberries may shortly be processed in much the same manner as cherries. Researchers at the U. of Wisconsin have developed a procedure yielding an end-product similar to maraschino-style cherries.

At present, cranberries have rather limited uses. But the new process is seen expanding their markets to include baking, candy making, desserts, and dairy products.

Briefly, the method includes: Piercing berries' skins to allow entrapped air to escape; killing fruit enzymes and removing color in a bath containing 1 percent sulphur dioxide and ½ percent slaked lime (5 day soak); removing most of air in a vacuum chamber; blanching with hot water; and absorbing sugar and dye in a series of successively stronger sugar solutions.

Why Halibut Gets "Chalky"

Fact that flesh of certain Pacific halibut sometimes becomes "chalky" is now attributed to a loss of water in the raw flesh of the fish. Examination of normal and very chalky halibut indicates that the former has about 10 percent more water than the latter fish samples.

The pertinent data was compiled by the Pacific Coast Stations of the Fisheries Research Board of Canada.

Compensating for the water loss, both protein and oil contents increase in the transition from the normal to the chalky fish. Protein goes up from 15.0 to 19.5 percent, while oil rises from 0.5 to 6.0 percent. From a nutritional standpoint, the chalky variety appears to be superior—having almost twice the calorific content of the normal.

Offers Global Service

A world-encompassing industrial project—the Overseas Business Service—has been formally announced by The McGraw-Hill International Corp., 330 W. 42nd St., N. Y. C. Designed to serve both American and foreign clients, the service is already maintaining offices in 70 countries.

Facilities offered include: Market surveys, confidential reports, economic studies, film shooting, and editorial services.

Report Earnings

Companies listing earnings late last year again indicate higher overall sales against lower net profits due to higher taxes and also increased overhead.

Following table summarizes net sales and incomes for food companies recently reporting (parentheses indicates loss):

	Sales, Net in Millions		Profits, Net in Millions	
Company	1951	1950	1951	1950
American Molasses Co.	$ 37.2	$ 35.0	$0.642	$ 0.415
Quaker Oats Co.	229.1	194.0	7.491	10.008
Purity Flour Mills, Ltd.	41.2	37.4	0.836	0.454
Wesson Oil & Snowdrift Co.	183.4	145.9	5.201	8.705
Minute Maid Corp.	29.4	25.0	1.108	(0.057)

Baked Goods Reconnoitered

Paul Busse of Anheuser-Busch and Charles Riley of the Brolite Co. inspect yeast-baked sweet goods displayed at recent meeting of Greater St. Louis Bakery Production Club. Messrs. Busse and Riley, along with Frank Shafer of Standard Brands and Paul Pfrommer of Durkee Foods, comprised panel which discussed production of such baked items.

Oil Sprays Reduce Quality

Petroleum oil sprays used on citrus for pest control cause reduction in the amount of soluble solids and lower the value of the fruit for juice concentrates, according to research at the University of California Citrus Experiment Station at Riverside, Calif.

The experiment station's work on the problem of soluble solid contents of citrus juices has covered use of additives to counteract the petroleum oil's effect, analyzing types of oils, and the emulsifiers used with the oil sprays.

Studies have included use of 2,4-D at a rate of four parts per million of the ester form as an additive with oil sprays. It has shown 2,4-D will reduce leaf drop that sometimes follows oil spray and will reduce mature-fruit drop.

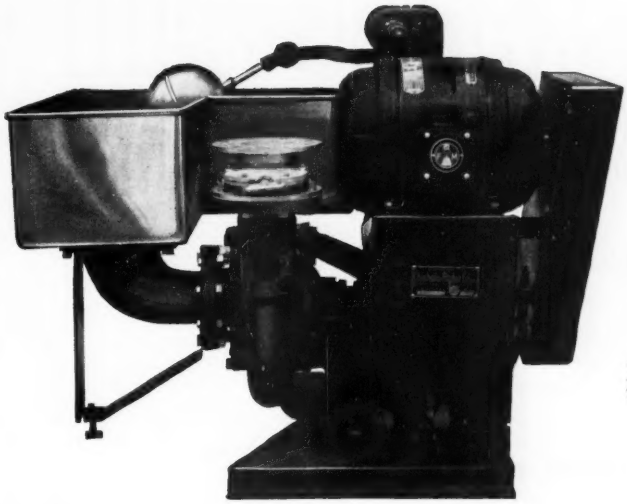
Re That "Bread Madness"

French health authorities still believe the "bread madness" that killed five persons and caused hundreds to suffer in Pont-Saint Esprit was ergot poisoning.

This is thought to have resulted from use of moldy grain to make the flour that went into the bread.

Chemical tests are being continued to definitely track down the cause.

OVERCOME HIGH HANDLING COSTS



CRCO Hydro Pumping Unit

Designed To Move To Any Distance or To Any Height Without Damage To Product

PEAS LIMA BEANS DRY BEANS
DICED VEGETABLES WHOLE GRAIN CORN
CHERRIES OLIVES CUT ASPARAGUS OTHER PRODUCTS

The Unit consists of the CRCO 4" Hydro Lift with the new bladeless impellor type Fairbanks-Morse Food Pump which minimizes the possibility of injury to product; a rod-washer, scavenger reel and supply tank. The lift has a low-intake stainless steel hopper, quick-acting float valve and Pyrex sight glass.

Regardless of distance or height traveled, the CRCO Hydro Pumping Unit insures a rapid transfer of the material without damage. Write for details and prices.

THE BEST OF Everything

CHISHOLM-RYDER CO. INC.
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GET POSITIVE CONTROL OVER FOOD QUALITY

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Blanketing against oxidative deterioration

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Drying or *Dehydration* free from oxidation

Blowing feed lines

DURING PACKAGING • STORING

Vacuum break-back before closure

Purging container free-space

Broad experience gained in applying inert nitrogen to a variety of processes shows that nitrogen protection helps preserve natural food color, flavor, and aroma, reduces vitamin losses sharply, and increases resistance to spoilage. This positive, threefold protection of food quality means greater sales appeal, and increased profit because of fewer quality rejects.

LINDE High Purity Nitrogen is supplied to the food industry as a gas in steel cylinders, or as a liquid in tank-car and tank-truck lots. Stored at your plant, the liquid can be converted to gas as needed, or used for lightning-fast cooling.

Call or write your nearest LINDE office today. Let us show you how to apply nitrogen profitably to *your* process.

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The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation

Traces of ergot have been found in the bread, and autopsies of the five victims are said to have revealed presence of the poison in the bodies.

A theory that contaminated water was the cause was negated following a series of tests on the town's supply.

Better Processed Butter

A new method for the clarification of butter is claimed by the Indian Dairy Research Institute of Bangalore, India.

The process is based on the fact that when butter is held undisturbed at 80 deg. C. for 15-30 min., three distinct layers are formed. This pre-stratification permits removal of most of the moisture and non-fatty solids from the original butter and dispenses with prolonged heating.

Resultant product is said to have

(*Continued on page* 178)

Hors d'Oeuvres

• Mattresses filled with milk fibers instead of horse hair may soon be the order of the "night"—according to researchers at the USDA. Get yours while they last —available in grade A, homogenized, and double-rich chocolate.

• *Good news for all wayward, watery oysters! The F&DA is clamping down its packed-oyster regulations prohibiting more than 5 percent water content in the canned product, with a hearing now scheduled against a Chesapeake Bay company.*

• Doughnut bakers have decided to reduce the size of the hole from 7/8 in. to 3/8 in. It's certainly a pleasure, in these days of shortage, to get less of nothing.

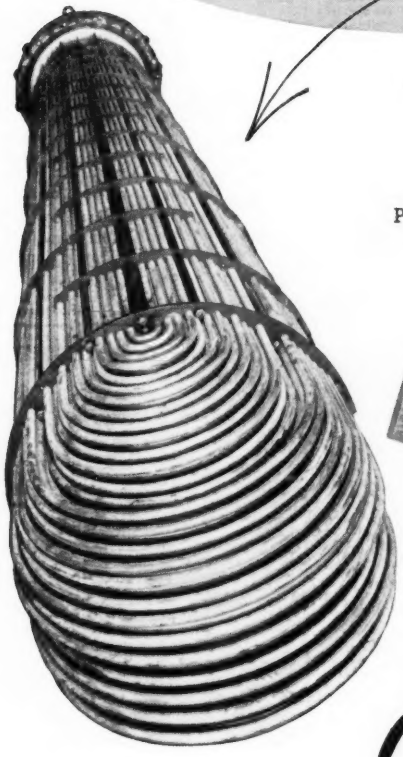
• *People attending the American Assn. of Cereal Chemists' convention in Texas next April will definitely get the point. They'll have to be vaccinated upon returning from their planned Mexico City field trip.*

• Right of U. S. cheese manufacturers to use traditional foreign names on cheese is threatened by a series of European trade agreements. But by Americanizing cheese names, sales may go up—people will at last be able to pronounce what they want.

• *Michigan State College and the USDA cooperated on research for the college Ag Station's Bulletin 374—"How to Reduce Apple Bruising". Hope the government steers clear of research on the already overworked apple-polishing field.*

• Chas. Pfizer & Co. announces that a new synthetic milk is being successfully fed to newborn piglets. However, success came only after the installation of a phonograph playing a recording of a sow's call to her young.

Bending and rolling-in go like a breeze with *Carpenter* Stainless Tubing



Thousands of feet of ⅝" O.D. x 16 gauge Carpenter Stainless Tubing are handled by this fabricator. And the uniformly easy way the tubes respond to fabrication gets important process jobs started on schedule.

When your process work calls for Stainless Tubing or Pipe, it will pay you to call your nearest Carpenter Distributor. He can give you the kind of help that keeps essential processes going.

BENDING and COILING Slide Chart...

Part of Carpenter's service to help you conserve critical materials is this Slide Chart for Stainless Tubing and Pipe. It gives bending radii and coil diameters for various sizes and gauges. A note on your company letterhead will start this Carpenter Slide Chart on its way to you.

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Alloy Tube Division, Union, N. J.

Export Dept.: Carpenter Steel Co., Reading, Pa.—"CARSTEELCO"

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STAINLESS TUBING

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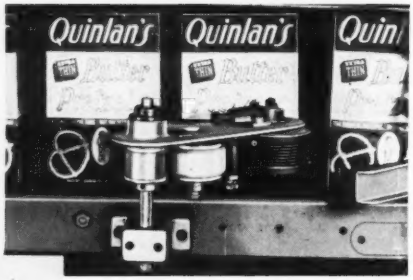
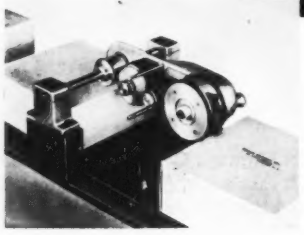
Now...spot-registered imprints on small cartons, cans, canisters

NEW ROLACODER 401





Why make a job out of marking? Let this new precision-engineered ROLACODER 401 imprinting machine mark code-dates, contents identifications, etc. on your package *automatically*. It's compact, versatile, designed for easy attachment to existing packaging or conveying equipment. Makes a single accurately-located imprint on any package with imprinting surface of 1¾" to 6¾". Friction-actuated . . . engineered for long-term efficiency on high-speed lines. Uniformly clean imprints assured by twin-roll ink transfer system and new Metalok diewheel that locks type securely, prevents slippage or movement.

• *Request new descriptive brochure ROL*

ADOLPH GOTTSCHO, INC., Hillside 5, N. J.

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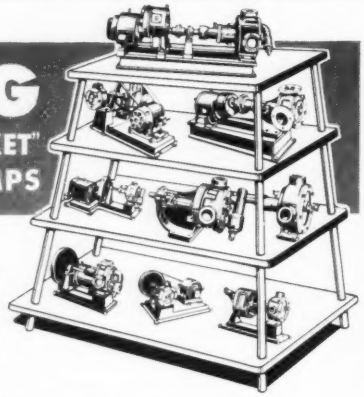
VIKING
THE "SUPER-MARKET" in ROTARY PUMPS



The range in size and style of Viking pumps truly parallels the range of items found in today's super-market.

When you specify Viking, there is no compromise. They fit the job at hand. Nowhere else can this *complete line of rotary pumps* be duplicated. When your needs must be fully met, consult Viking for the answer. To start, ask for Folder D100E and E100E today.

VIKING
AN HONORED NAME IN PUMPING

See Our Catalog In SWEETS

Viking PUMP COMPANY
Cedar Falls, Iowa

low acidity, higher vitamin A content, and better keeping quality. Other advantages claimed are low fuel consumption and negligible wastage.

The technic is being commercialized on a large scale for the manufacture of ghee, the cooking oil of India.

English to Cut Meat Imports

Climbing British purchases of canned goods from Europe may force Parliament to restrict imports of these foodstuffs. Trouble is that Britain has developed an unsatisfactory trade balance with the Continent.

Meat products particularly will be hard hit. British housewives have been depending upon European canned meats to provide this staple in their diets during the past year.

Imports of these products has increased more than ten-fold during the past year, in spite of their high cost.

OSC Opens Food Lab

Oregon State College's department of food technology has officially opened its new food laboratory, built at a cost of $695,000.

The building contains complete facilities to study commercial canning, freezing, and dehydration of foods.

(*Turn to page* 181)

Sliced-Apple Confab

R. L. LaBelle (left) of N. Y. State Agricultural Station in Geneva, chats with Ben Miles of Comstock Co., Newark, N. Y., about preliminary results obtained at Station's sliced-apple pilot plant. One of significant conclusions is that agitating apple slices in blancher will cut blanching time in half. State group's 4th annual processing meeting was occasion for this get-together.

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difference

makes the
SALES
difference

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Dow Mill Spray may be used as a long-lasting residual spray, a fog-type aersol or a space spray. It kills a wide range of insects and it kills faster.

The convenient coupon below will bring prompt information. We suggest you fill it out and mail it today.

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"Metal-Cals" Catch On

These paper-thin aluminum decals are reported gaining favor for product labeling, equipment identification, panel-board marking, and the like. Developed by Boeing Airplane Co., they're abrasion-proof, easily applied, and almost as inexpensive as paper. A special chemical process insures excellent color-retention on the .003-in. stock, and a custom-designed adhesive prevents slipping. C & H Supply Co., Seattle, is licensed by the Boeing Company to make these appliques.

IIT Offers MS in FE

Graduate study leading to a Master of Science degree in food engineering has been introduced by the Illinois Institute of Technology, Chicago. IIT, the first school to offer a 4-year course and degree in food engineering, reports a steady, if gradual, growth in the number of students seeking careers in this new branch of applied science and engineering.

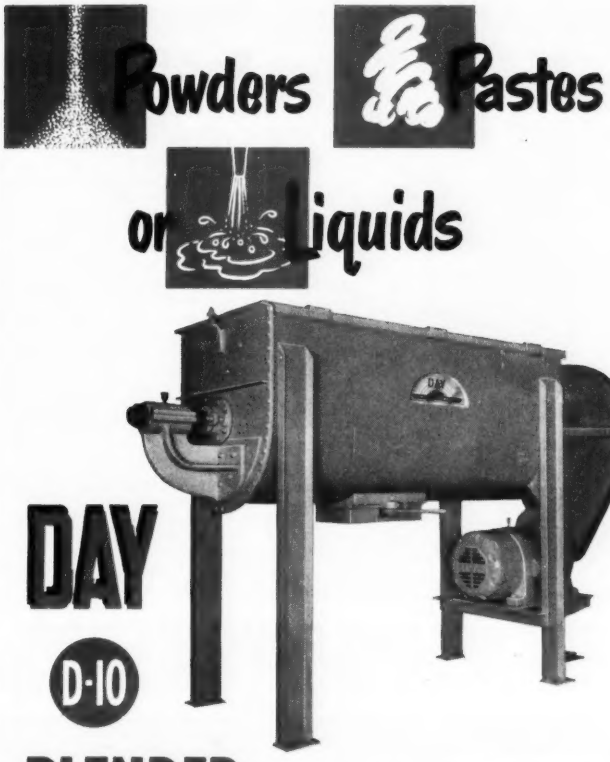
USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Beans (*Mung and Yelloweye*), revised, page 11327, Nov. 8 *Federal Register,* effective Nov. 8. (Correction on page 11763, Nov. 21 *Federal Register.*)

Frozen concentrated blended grapefruit juice and orange juice, new, page 11409, Nov. 9 *Federal Register,* effective Dec. 9.

Canned pears, third revision, page 11557, Nov. 15 *Federal Register,* effective Nov. 30. (It is stated that for various reasons "the revised standards will create no hardship to the industry", therefore effective date is 15



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Schedule of Events

January

14–17—Plant Maintenance Conference and Show; Convention Hall, Philadelphia.
15—Manufacturing Chemists' Assn., Inter-Industry conference on chemicals in foods; Hotel Statler, New York.
16–18—Canadian Food Processors Assn.; Chateau Frontenac, Quebec.
19–23—National Canners Assn., National Food Brokers Assn., and Canning Machinery and Suppliers Assn., annual convention; Auditorium, Atlantic City.
28–30—National Dairy Council, annual meeting-winter conference, Hotel Syracuse, Syracuse, N. Y.

February

10–12—Institute of American Poultry Industries, 23rd annual fact finding conference, Municipal Auditorium, Kansas City, Mo.
14–16—Western States Meat Packers Assn., sixth annual meeting; Biltmore Hotel, Los Angeles
19–21—Technical Pickle School, Michigan State College, East Lansing.

days instead of 30 days from publication.)

Processed raisins, second revision, proposed, page 12400, Dec. 8 *Federal Register*, written comments received until Jan. 7.

Swiss cheese, revised, proposed, page 12399, Dec. 8 *Federal Register*, written comments received until Jan. 7.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early December is given in review below:

Policy Statement

Foods which are repackaged in retail food establishment may soon be exempt from certain labeling requirements. F&DA has proposed that quantity of contents need not be labeled if purchaser's order is weighed, measured, or counted properly at time of purchase. Similarly, ingredient labeling on bulk containers will be adequate if properly displayed in the retail establishment. And artificial flavoring, artificial coloring, or chemical preservative declaration can be similarly displayed.

Also, food retailers may soon be able to comply with the FDC Act if bulk containers of foods properly display the interstate label with identification of the food and its source.

These proposals were on page 11458 of the Nov. 9 *Federal Register*. Written comments were to be received until Dec. 9.

Future Hearings

1. *Salad dressing*, rehearing, standards of identity; "skim milk and milk products" proposed as optional ingredients. F&DA gathering data; no hearing date set yet.

2. *Process cheese food,* amendment, standard of identity; skim milk cheese proposed as optional ingredient. No hearing date set yet.

3. *Canned tuna,* hearing in early 1952 expected, but no date set yet; initiative of Administrator.

4. *Frozen vegetables,* informal conference held in October; formal hearing unlikely before another season; initiative of Administrator.

Hearings in Progress

1. *Ice cream,* new, standard of identity. Direct testimony (during two weeks in early November) was followed by a recess from Nov. 16 until Jan. 9, when additional evidence was expected from a witness Atlas Powder Co. had scheduled to testify on harmlessness of surface-active agents. Other interested persons may also appear at that time. Cross-examination of these and earlier witnesses will begin after an adjournment, in conformity with the arrangement previously announced (see p. 197, Dec. '51 FE).

2. *Canned pineapple and canned pineapple juice,* new, standards of identity, quality, and fill of container. Further data on proposals of standard of fill for canned pineapple will be received on Mar. 4. Other parts of the hearing have been completed, and briefs were due by Dec. 17.

Tentative Order Awaited

Residue tolerances, on fresh fruits and vegetables, new. Expected during early part of 1952, although delayed by departure of two F&DA staff members, who had been working on the record; hearing adjourned Sept. 1950; briefs filed Dec. 1950.

Final Orders Awaited

1. *Bread,* new, standard of identity. Expected soon; tentative order published Aug. 1950; exceptions filed in Nov. 1950.

2. *Frozen fruits,* new, standards of identity and fill. Expected soon; tentative order published in Oct. 1950; exceptions filed in Jan. 1951.

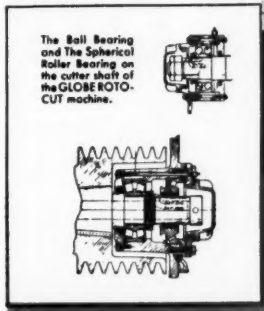
3. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; tentative order published in Feb.; exceptions filed in April.

4. *Fruit preserves, jellies, and butters,* amendment, standard of identity. Expected very soon; tentative order published in July; exceptions filed in August.

5. *Canned tomatoes,* amendment, standard of identity. Expected soon; tentative order published in September; no written comments had been received by Oct. 22 deadline.

6. *Margarine,* amendments, standard of identity. Deadline for filing exceptions to tentative order extended from

GLOBE ROTO-CUT meat cutters are the standard of the Packing Industry. They produce better meat products at higher speed.



The Globe Company says:

THIS LUBRICANT INCREASED BEARING LIFE FROM 2 WEEKS TO 2 YEARS

"After we had quite a few of our large high speed ROTO-CUT meat cutting machines in actual production operation, the ball and spherical roller bearings on the cutter shaft gave us serious trouble. Some bearings did not last even two weeks.

"In an effort to correct the difficulty, we contacted a number of the large lubricant manufacturers. We tried all the lubricants their engineers recommended without the slightest success. We checked with the manufacturers of the bearings who assured us that the bearings were not overloaded. The trouble was the condition that prevails throughout the meat packing industry, animal acids and moisture, a combination most harmful to ball and roller bearings.

"Then, Ball Bearing LUBRIPLATE was called to our attention. The results we obtained from its use were most gratifying and amazing. We have had these ROTO-CUT machines lubricated with Ball Bearing LUBRIPLATE in continuous operation, twenty-four hours a day, three hundred days a year for over *two years without a single bearing replacement.* We now use LUBRIPLATE for factory lubrication and recommend it to our customers for use on practically all the equipment we manufacture."

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YES, LUBRIPLATE LUBRICANTS ARE DIFFERENT! They reduce friction, wear and power consumption . . . prevent rust and corrosion and last longer than ordinary lubricants. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest density greases. There is a LUBRIPLATE product best for your every lubrication need. Write for case histories of the use of LUBRIPLATE in your industry.

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SYNTRON COMPANY

460 Lexington Avenue Homer City, Penna.

Nov. 12 to Dec. 13, by order published page 11787, Nov. 21 *Federal Register*. Exceptions already filed criticize the proposal to accept the soybean margarine proposed by Lanastone Products Co. Also criticized: The rejection of stearyl citrate; the labeling of isopropyl citrate and citric acid if used; and the wording of the vitamin paragraph.

Standards Completed

None since last reported (p. 197, Sept. '51 FE).

—*End*—

Prepackaged Produce

—Continued from page 98

uct to the required 40 deg. F. level—rises of 10 to 15 deg. being encountered. On the other hand, the Thermo-King mechanical units did the cooling job satisfactorily in almost all cases.

Retail Checks

In still another series of tests, the P&MA, Florida Agricultural Experiment Station, and the Dickman group cooperated with a number of retail outlets in determining the feasibility of prepackaging produce at the farm.**

Almost a million consumer-sized packages of husked and cut sweet corn were prepared at Ruskin for the tests. Detailed costs of manufacture and distribution were compared with bulk, consumer opinion surveys were conducted, and preliminary conclusions drawn.

This study showed the new marketing procedure performed favorably on the following counts:

1. Net returns to the grower for marketing prepackaged vegetables closely approximated those from marketing bulk produce—not taking into consideration the byproduct value of trimmings from prepackaging.

2. The additional costs of prepackaging over bulk are largely offset by lower transportation costs, less spoilage in the marketing system, and lower retail handling costs.

3. Prepackaged and bulk products would sell about the same at equivalent retail prices.

** Spurlock, A. H., and Stokes, D. R., *Marketing Florida Prepackaged Sweet Corn*. Florida Agricultural Experiment Station and P&MA, USDA, Apr. 1949.

End (*Resume reading on page 99*)

Licks Packaging "Bug"

—Continued from page 83

on a slave stepper-type relay shaft and thus was actuated by each capless

bottle that passed. When a pre-determined number of uncapped bottles then went by the detector, this cam would have rotated to a position where it could move a micro-switch. Action of the latter would stop the bottling line.

Another request concerned the actuation of a reject gate for uncapped bottles. This would allow production to continue while any capless units would be re-routed by conveyor back through the capping machine.

"Will It Work On—?"

In the spring of 1949, with six commercial installations, the device was finally patented. With this came industrial press publicity and a flock of letters to the inventor.

"Would this 'electric-eye' unit work on wine?" . . . "How about uncapped milk bottles?" . . . "Can unsealed orange concentrate cans be picked up?" . . . "Will it be suitable for beer, catsup, cosmetics?" . . . "What do you think of its possibilities in relation to imperfections in paperboard containers?"

These were but a few of the many problems which appeared as "fair shooting" after the original success of the device. And Gingrich spent his nights and week-ends experimenting so that he could intelligently answer his queries.

Under such hectic and promising conditions Gingrich—literally swamped—decided to enter an arrangement with the W. F. & John Barnes Co. of Rockford, Ill., which is now commercializing the device.

End (*Resume reading on page* 84)

Synchronous Motors

—*Continued from page* 130

supply fairly large amounts of kilovars to a power system while performing its usual driving duties.

Ability of either unit power factor or 0.8 power factor synchronous motors to bring improvement is a function of load and excitation. Decreasing the mechanical load without changing the field excitation increases the reactive kva. output of the motor.

The accompanying chart shows the reactive kva. that two typical synchronous motors will deliver under various load conditions with normal excitation. It is seldom economical to operate a synchronous motor at part load in order to gain greater power-factor improvement, and the motor should never be over-excited for this purpose, for this practice can lead to serious overheating.

Another desirable characteristic of

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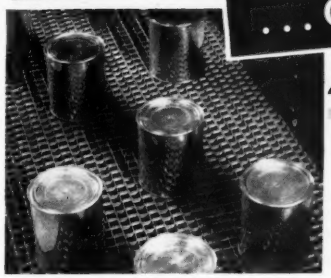

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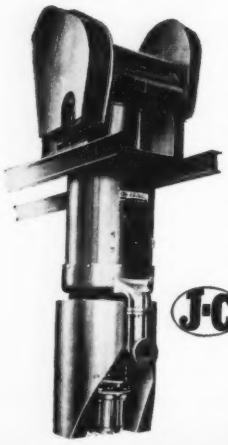

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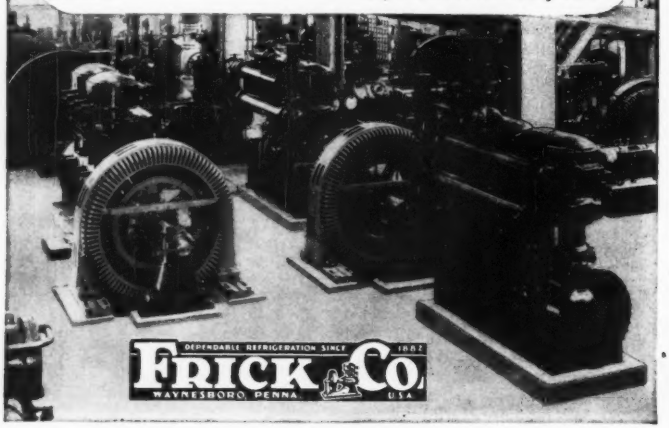
Celanese Corp. Uses 6420 Horsepower of Frick Refrigeration

Fourteen Frick refrigerating machines are in operation at the Amcelle plant of Celanese Corporation of America, near Cumberland, Md., makers of chemical yarns. Most of these ammonia compressors have been in use since 1929. The motors driving the new vertical machines, shown in the foreground, are each of 1250 hp.

This is a large-scale example of the dependability and economy of Frick ammonia refrigeration. Power requirements, when operating in summer weather on air conditioning loads, are only 0.70 hp. per ton of refrigeration.

The really important jobs, whether for air conditioning, ice making, or other commercial cooling work, call for FRICK refrigeration.



the synchronous motor with regard to its effect on the plant power supply is its tendency to stabilize the voltage. Under conditions of high voltage, the reactive kva. furnished by a synchronous motor decreases. And under conditions of low voltage within reasonable limits, it increases. The motor, therefore, has a tendency to hold a constant voltage in the power supply.

Full Load Efficiency Is High

Furthermore, synchronous motors usually have a higher full-load efficiency than any other type of motor, and they produce a greater amount of work per dollar's worth of power consumed. Where loads are heavy and continous, an advantage of from 0.5 to 3.0 percent in efficiency saves a considerable sum in operating expense, and it leaves more power available for other plant equipment. At reduced loads, the difference becomes greater to a marked degree, for an efficiency of 75 percent at 5 percent load has been attained in a synchronous motor.

Whether or not a synchronous motor should be installed for power-factor correction depends upon several considerations. A careful study might reveal that the particular plant and application might lend themselves better to induction motors and capacitors under certain conditions. The total cost, total load, present power factor, and amount of power-factor improvement desired all have a bearing on the type of apparatus best suited to attain improvement. And the provisions made for obtaining a high power factor in a brand new plant are likely to be quite different from those feasible in an existing plant.

Table I is a tabulation of multipliers which may be used to determine the number of kilovars required to improve power factor by given degrees. Table II shows the kilovars generated by synchronous motors per kw. input at various power factors. These tables may be used together to determine the approximate size of synchronous motor needed to accomplish a required power factor improvement.

Desirable Characteristics Listed

Besides their ability to improve the efficiency of plant power systems, synchronous motors have other good characteristics which make them especially suitable for many kinds of large motor drives. Some of these are:

1. They may be obtained at very low speeds, thus eliminating or reducing the need for speed-reducing gears.

2. The construction of low-speed synchronous motors results in a saving in space along the shaft when the

motor is to be overhung or built into the driven machine.

3. Split rotor construction is optional in low-speed types, which facilitates assembly on shafts of driven machines.

4. Maintenance costs are low—the result of inherently simple construction which leaves all parts accessible.

5. In ratings where the hp. is equal or greater than the speed, these motors have a lower first cost, including control and exciter, than any other a.c. unit with its control.

6. A wide range of torques is available to permit starting under heavy loads.

7. Dynamic braking brings heavy loads to a smooth, quick stop.

8. Since these motors run at an exact rated speed, they insure a constant rate of production in constant-speed applications. This feature is not affected by voltage changes.

9. The motors have an inherently large air gap, making field assembly and maintenance easy and economical.

End (*Resume reading on page* 131)

Centrifuging Better Juices

—*Continued from page* 67

product, these slow-settling selected solids make for a very palatable juice with smooth, uniform texture.

Solids are continuously discharged from the separating chamber or bowl of this centrifuge. Since solids do not build up periodically in the bowl, the separating characteristics or performance of the unit remains unchanged for any time period of operation. This simplifies control, since no adjustments are required, except to compensate for changes in the characteristics of the juice being fed to the centrifuges.

Mechanically Simple

There are no valve devices or moving mechanisms in the separating chambers of this centrifuge. The rotating bowl is the only moving part. To clean this equipment, a strong caustic soda solution is introduced throughout the feed system and sent into the return wash circuit, flushing for about 15 min. while the machine is running.

The valve-operated hydraulic hoist incorporated in the frame of the unit makes it easy for the operator to open the centrifuge for examination.

Maui centrifuges all of it's juice through Merco separators and does not blend juice that has not been treated. Fully 100 percent of the pineapple juice is thus treated with a continuous centrifuge—insuring a uniform, high-quality finished product.

End (*Resume reading on page* 68)

Apples Given Chemical Bath Economically
● Prepared pie apples must be chemically treated to retain that "just sliced whiteness" until they reach the baker. Many processors find that a Cyclone Stainless Steel Flat Wire Conveyor Belt is a very economical way to carry apples from the slicing machines through the chemical bath and on to the packing tables. Steady flow of slices to containers is established.
There are "bottlenecks" in many food plants that can be eliminated with the installation of the "right" Cyclone Conveyor Belt. Our experienced engineers will be glad to assist you in deciding which of our 3 types—Flat Wire, Flex-Grid or Chain Link—will best serve you. Write for our free catalog #4. Address: Cyclone Fence, Dept. M-12, Waukegan, Ill.
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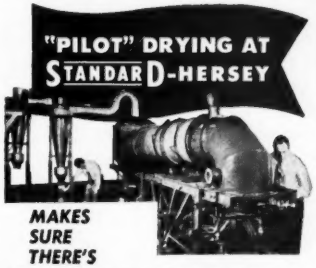

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And just three parts per million kills foam during strawberry jam concentration.

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Superior Quality Wines

—Continued from page 91

agent. Removal of cream of tartar and cold-precipitable colloids is speeded by a cold-stabilization process—chilling the wines to 25 deg. F. and then permitting the solids to precipitate during aging.

Air-Conditioned Cellars

Still wines may be racked four times over a two-year aging period. One winery ages dry white wines 4-5 years in white oak casks in an air-conditioned storage cellar. Temperature of the cellar is maintained at 57 deg. F.—the optimum temperature for aging wines in storage.

Air-conditioning is employed for three reasons: (1) To keep the cellar dry, clean, and mold-free; (2) to reduce evaporation losses; and (3) to slow down aging.

Too rapid aging of the high-acid New York State wines is not desired. Reason: Dry wines must be rapidly bottled, with exclusion of headspace air to prevent slow adverse changes in flavor. If these wines are kept too long in wooden casks or are aged too rapidly, they become overmature. Hence, wines are bottled at proper age and stored in bins.

In producing varietal wines, the vintner must depend upon New York grapes and he must provide for long cellar life by a combination of wood and bottle storage. He must also hold sufficient varietal wines in reserve as a safeguard against crop failures.

Blending of the wines calls for skill. Final blends are made up by the winemaker, according to taste, in wooden or glass-lined metal tanks. Through precise blending, uniform quality is assured, despite variations in the grapes from year to year.

Prepared at this stage are natural (table) and dessert (fortified) wines. Natural wines normally contain less than 14 percent alcohol. Dessert wines possess some sweetening as well as enough 180-proof California grape brandy to increase the alcohol content to a 19-21 percent range. Both natural and dessert wines go back to storage casks, where they are held at least six months prior to bottling.

Table wines are corked. Corks are first softened and sterilized in hot sulfite water, then are squeezed into the narrow-neck bottles by foot-powered corking machines. By forcing the cork close to the surface of the wine, much of the headspace air is excluded (via the neck)—another significant protective measure.

Solera-Processed Sherry

One New York State winery makes its sherry by an adaptation of the Solera process—the centuries-old Spanish technic. One-year old sherry is roofstored in 50-gal. white oak barrels. Exposed to the action of the sun, oxidation of this fine-bodied sherry is completed in three years. As a safety factor, however, this winery stores its sherry an extra year to insure the development of the characteristic nutty flavor so popular in this type of wine.

After the 5-year old sherry has gone through this regulation process, it is pumped to the wine cellars, where it is blended with previous bottling stock of the same type of sherry, then bottled and marketed. Ready for bottling, the wines are flash-pasteurized at 180-190 deg. F. in stainless steel heat exchangers.

Some wines are not pasteurized, instead are polished and germ-proofed by passage through plate-and-frame asbestos-pad filters with stainless parts. Wines are then pumped to glass-lined metal holding tanks, from which they are gravity-fed to filling machines.

Even with the wine finished, these quality-minded vintners take further precautions. For instance, cases of empties

are shipped with the bottles inverted to prevent contamination by lint and other foreign matter. After leaving the unscrambler, bottles next go to an automatic, inverted air cleaner. Here, bottles are conveyor-fed in upright position to a reversing drum where they are inverted, cleaned with a blast of filtered air (60 psi.), and then returned, upright, to the same conveyor.

The fillers are high-speed, stainless steel rotary vacuum units. Dessert wines are generally capped. Employed are screw caps or threadless aluminum foil caps with cork backing and vinylite seal. A Cello-Seal band is slipped over the cap, or thin-gage aluminum foil is crimped over it.

Still another precautionary measure is taken by another winery—inspection of filled bottles before casing and conveying the cases to storage areas. Bottles are checked with the aid of a strong light and 16-in.-dia. magnifying glass (4X). This magnifier is attached to the conveyor in front of the inspector.

Purposes of making a final inspection are to detect bottles that may have been cracked during filling and capping, improperly filled, or chance-contaminated with foreign matter. Those bottles that do not pass muster are taken off the line, and their wine is dumped into a portable stainless 50-gal. vat, later recovered by filtration.

Final safeguarding step is packing in special shipping cases designed to permit the bottles to lie on their sides during storage. Thus, the corks are kept moist and no air acts upon them.

Acknowledgments for cooperation in formulating this article are made to President R. H. Howell, The Pleasant Valley Wine Co., Rheims (Hammondsport), N. Y.; President Greyton H. Taylor, The Taylor Wine Co., Hammondsport, N. Y.; and Secretary N. E. Paul, Widmer's Wine Cellars, Inc., Naples, N. Y.

End (Resume reading on page 92)

A coffee company in the Southwest was "giving away" an average of 1/8 oz. with every 1 lb. package due to overweights. Now, with Triangle Elec-Tri-Pak Weighers, they weigh and fill packages to an average accuracy of *plus or minus 1/32 oz.* Maximum variation is only 1/16 oz. — underweights are rare. The saving in coffee alone averages *$35.00 per day!*... enough to pay for the machine in only 100 days operation.

The new Elec-Tri-Pak machines fill bags, jars, cartons, cans by weight to hairline accuracies like these:

- **Coffee ± 1/32 oz.**
- **Gran. Sugar ± 1/32 oz.**
- **Onions ± 1 piece**
- **Cookies, candies ± 1 piece**
- **Potato chips ± 1/16 oz.**

How much of your product are you giving away? Triangle precision weighers will curb your generosity. WRITE TODAY explaining your requirements. ASK FOR BULLETIN.

TRIANGLE PACKAGE MACHINERY CO.

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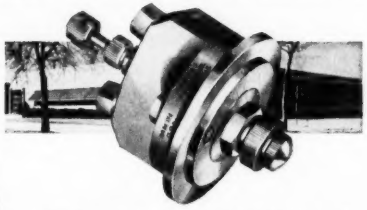
Dallas • Portland • Denver

to the 99 plants in 100
***who use* SPRAY NOZZLES**



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In the search for doing things better and faster, have you overlooked the importance of spray nozzles? Your application may be commonplace or complex... but whatever it is, properly engineered spray nozzles can make a vast difference. Let Spraying Systems Co., America's foremost authority on industrial spray nozzles show you why and how. As a first step, write for catalogs.

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Pneumatic Atomizing Nozzles

CUT CASE SEALING

COSTS UP TO..65%..

Actual field tests show that 109 BOX-WELD'S extra speed, amazing mileage, and ability to handle a great variety of cases, has cut case sealing costs as much as 65%! It is consistently out performing even expensive resin emulsions in many cases. New 109 BOX-WELD is ready to use, NEVER requires dilution. It bonds fast (15 to 20 seconds compression) even on tough, springy flaps . . . works equally well on machine or by hand . . . on all types of cases.

You Save 5 ways

- Low initial cost
- Permits increased speed
- Handles a wide variety of stock
- Gives greater mileage
- Eliminates production waste and down time

A PREMIUM PRODUCT AT A COMPETITIVE PRICE!

On a price-performance basis No. 109 BOX-WELD challenges comparison. Get the facts now. Write for results of field tests and a sample lot.

No. 109 BOX-WELD is a product of The F. G. Findley Company. Manufactured for distribution on the east coast by the Union Paste Company, Hyde Park, Massachusetts.

Findley's INDUSTRIAL ADHESIVES exclusively

plants at: MILWAUKEE AND HOUSTON

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THE F. G. FINDLEY COMPANY • W. PEMBERTON AVE. • MILWAUKEE 45, WIS.

Men & Companies

M. A. Reilly has been promoted to vice-president of Thomas J. Lipton, Inc. He will direct all sales activities.

Industry

Barnett Laboratories, Long Beach, Calif., has converted a plant at Soledad, Calif., into a unit for production of carotene. Company now has capacity to process 50 tons of carrots daily.

Continental Freezers, Chicago, is building a $2,500,000 refrigerated warehouse. Freezing facilities, as well as storage space, will be available.

Florida Citrus Canners Cooperative has named W. C. Pederson of Waverly, Fla., as president. He succeeds D. A. Hunt, who continues as a director. Other officers elected include E. G. Todd, M. H. Walker, J. H. Childs, and L. A. Wheeler.

The Glidden Co. has promoted George F. Atkinson as assistant to president, while H. F. Winger has been made a regional director at Reading, Pa., plant.

Grocery Manufacturers of America, Inc., elected these men to top offices at their recent meeting: Paul S. Willis, president; O. E. Jones, vice-president; George H. Coppers, vice-president; Joel Mitchell, vice-president; W. A. Dolan, secretary; and B. E. Snyder, treasurer.

H. J. Heinz recently upgraded six men to vice-presidential positions. They are—N. E. Daniels, purchasing; Fred C. Heinz, industry relations; C. L. Rumberger, research and quality control; P. K. Shoemaker, manufacturing; Charles Heinz, personnel; and Harvey Williams, overseas operations.

Hunt Foods, Inc., announces advancement of Irving Goldfeder to executive vice-president. Also, Edward Mittelman and Hans Erlanger have been promoted to vice-presidencies.

Kellogg Co., Battle Creek, Mich., has purchased the Welch Grape Juice plant at San Leandro, Calif., and plans to make it its West Coast cereal manufacturing and packaging center.

National Coffee Assn. at its recent convention elected Edward Aborn, president; Albert Ehlers, treasurer; and W. D. Roussel and W. F. Williamson, vice-presidents.

National Tea Co. has purchased a five-story warehouse adjacent to its Chicago executive office building.

Noosack Packing Co. has been organized at Lyndon, Wash., to pack quick-frozen berries for the institutional trade.

Stokely Foods, Inc., expects to complete its new million dollar processing plant, just south of Dallas, early this year. Rations for the armed forces will be processed at the plant, in addition to the regular Stokely Van Camp lines of canned foods.

Tea Bureau, Inc., has made Anthony Hyde its president. He will also continue in his present capacity of managing director.

Personnel

William J. Ayers, president of Standard Ice Cream Co., Memphis, was elected president of National Assn. of Ice Industries at its convention in Houston.

(*Turn to page* 192)

P. K. Shoemaker was elected vice-president in charge of manufacturing of H. J. Heinz Co. at recent meeting of firm's board.

Planned Hiring Program

—Continued from page 60

assurance a man will be practically intelligent in a position under adverse circumstances. Moderate ability or intelligence is often more advantageous than actual brilliance or flashes of genius.

Our job is to develop in men the ability to think, act, and behave intelligently and responsibly in industry; to work cooperatively with others, realizing they can't do the job alone; and to provide others, with tools, methods, and opportunities to work effectively.

Can Find Clues From Past

The patterned interview (developed by Dr. Robert N. McMurray) given to applicants for supervisory positions in our company functions on these factors:

1. What a person *will do* is largely determined by his basic habits.
2. These habits develop early in life, become deeply rooted, and are almost impossible to change.
3. A careful review of what a person has done in all major phases of his life—work, school, early home life—will reveal his basic habit patterns.
4. With a comprehensive knowledge of these patterns it is possible to predict their influence on his performance on the job.

In other words, the patterned interview is actually the equivalent of a long and close acquaintanceship with the applicant. In fact, it usually provides an even better insight to the individual by giving you a clear picture of what he has done. Thus determining his basic habits, you can predict, with surprising accuracy, what he will do.

The patterned interview has been designed to overcome the faults and limitations of ordinary interviewing procedures. It provides:

1. A systematic plan for the interviewer to follow.
2. A technic for getting the facts.
3. A set of principles to use in interpreting the facts.
4. A method of minimizing personal biases and prejudices.

We then collate our knowledge of what the applicant has done, how he did it, and what he will and can do, and match it against the job description, the information obtained from the application blank, the interviews, the tests, and the physical exam. We weigh both strong and weak points, then make our choice.

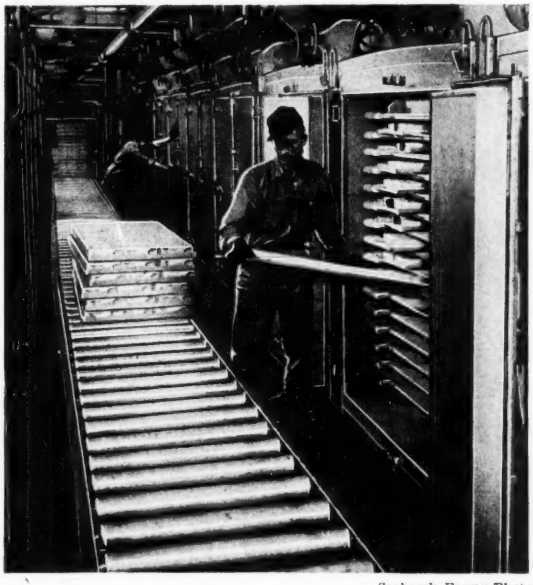
After having devoted so much time to the hiring of an employee or a supervisor, it is just as important to get him off to a good start. This calls for the follow-through, on well-organized initation procedure.

Since first impressions are so important in the development of loyal, steady, efficient, and satisfied workers, it is well worth the time to do all of the following:

Greet him cordially on his first day. Display a sincere interest in him. Explain the part he will play. Show him around and introduce him to his co-workers. Choose the right men to instruct him. Tell him what is expected of him. Let him know how he is getting along. Show him how to improve. Tell him in advance of possible changes that will affect him, and why. Give credit where and when due. Recognize his extra effort and reward it. In brief, follow up—don't forget him, and prepare him for the bigger jobs ahead.

You'll find it can be both fun and profitable to build a good business with capable, well-trained people.

End (*Resume reading on page 61*)



Seabrook Farms Photo

16 of the 64 Model B 15 Station Brine recirculating type Amerio Positive Contact Plate Freezers in Operation at the

SEABROOK FARMS CO. Bridgeton, N. J.

"You Know It's Right"

When You Freeze With

Amerio

Positive Contact Plate Freezers

Patent Applied for

Designed for

AMMONIA, BRINE or FREON REFRIGERANT

Send for Illustrated Brochure

Amerio
Contact Plate Freezers Inc.
Union City, N.J.
It's the Contacts that Count

The Finest Foods

Taste Better
Sell Better

when you add a little

Huron MSG

MONOSODIUM GLUTAMATE 99+%

to your present formula

Yes, the finest food products can be made to taste even better and be given new taste appeal and more sales appeal with the addition of Huron MSG.

Huron MSG can be added in small quantities to your present formula and no other changes are necessary. The cost can be kept surprisingly low.

Proof—try it yourself on your own products by simply writing us today for sample quantities. Or our Technical Service Department will be glad to make specific recommendations.

THE HURON MILLING COMPANY

Factories—Harbor Beach, Michigan

Gen. Sales Offices—9 Park Place, New York City 7

161 East Grand Ave., Chicago 11 • 13 E. 8th St., Cincinnati 2

383 Brannan St., San Francisco 7

Harvey L. Slaughter has been appointed general manager of The Glidden Co.'s Durkee Famous Foods Div.

Hans F. Dresel, secretary of American Assn. of Candy Technologists, is to visit European candy manufacturers in non-iron curtain areas this year.

Arthur N. Duffy was appointed director of sales for National Biscuit Co. He has been with organization since 1920.

F. E. Glotfelty has been named director of traffic and packaging for Corn Products Refining Co. He was formerly manager of company's plant in Pekin, Ill.

John L. Kask was recently promoted to head Fish & Wildlife Service's Office of Foreign Activities. Dr. Kask was assistant director of Service's Oceanic Investigations in Honolulu.

Howard O. Hunter, for past two years executive vice-president and director of American Institute of Baking, has now been elected to Institute's presidency. And Lois E. Caster has been re-elected chairman of board.

John R. Little has been elected president and general manager of Golden State Co., Ltd., San Francisco. He was formerly associated with Radio Corp. of America in New York.

Harvey A. Lynn of Riverside, Calif., is the new president of California Fruit Growers Exchange. He has been active in citrus for more than 45 years, having been on Exchange's Board since 1921. All the other top officers were re-elected including L. E. Lyon, L. W. Fowler, and R. R. McLain.

A. H. Moseman has been appointed chief of USDA's Bureau of Plant Industry, Soils, & Agricultural Engineering. He was active in Bureau's vast research program.

Roy C. Newton, vice-president of research at Swift & Co., Chicago, was awarded 1952 medal of Industrial Research Institute, Inc. Formal presentation will be made in May.

Walter Richmond has been named superintendent in charge of manufacturing at Atlanta plant of Norris Candy Co.

Walter T. Sattler is new product manager for Snow Crop Marketers. He had been with Birds Eye-Snider as product manager of concentrates and specialties.

Ray W. Sawyer has been appointed vice-president and western division manager of Kellogg Co. He replaces George E. Ander, now chairman of division. Headquarters of both men are in Chicago.

George W. Schreck is now president of Farallone Fisheries, Inc., Santa Barbara, Calif. He succeeds the late William F. Adler.

Louis C. Stevenson has been named a vice-president of Ralston Purina Co., St. Louis.

Associated Industry

American Can Co. has created a new research and technical service department to enable company to place more emphasis on creative research. B. S. Clark will be overall scientific director, with R. W. Pilcher as research director, D. F. Sampson as technical director, and F. W. Geise as agronomy head.

Continental Can Co. has now filled the three new board openings recently created by its stockholders. Elected were John M. Franklin, N. Y.; Paul C. Cabot, Boston; and Stephen D. Bechtel, of San Francisco.

Cherry-Burrell Corp., Chicago,

Mrs. Ellen Semrow has returned to American Institute of Baking as director of consumer service.

Be Sure — OF YOUR PRODUCT'S APPEARANCE ...ITS "TAKE HOME" FRESHNESS

High speed automatic wrapper meets today's modern packaging demands at new low production costs!

No matter what your product—its size, shape, substance, or texture — chances are you can wrap it faster, cheaper, protect it better, and give it more merchandising eye-appeal with the Campbell Wrapper. Neat, square-cornered packages with perfectly impositioned labels, fully heat and glue sealed to preserve factory flavor and product freshness are yours — and at amazing new production speeds of up to 120 units per minute! Machine uses wrap material of any kind — and less of it! Save labor, too . . . in most cases only one operator to feed and one to pack are required. Get full particulars on this modern mechanical wizard now! Write for fully illustrated brochure.

TUBULAR OVAL OBLONG IRREGULAR BEVELED SIDES FLAT

Wraps products of all shapes . . . and sizes

Campbell WRAPPER

HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

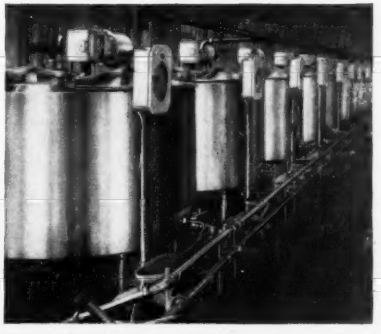
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units.

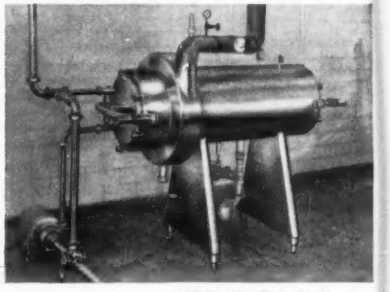
Protect natural flavor and appearance of food products

Mojonnier heating equipment protects the flavor and appearance of food products because it is designed so that heating temperatures, and the placement of heat, can be closely controlled.

If you have a heating problem, consult Mojonnier today for the facts about Mojonnier Zone-Control Vats and Tubular Heaters. Write:

MOJONNIER BROS. CO.
4601 W. Ohio St., Chicago 44, Ill





▲ Mojonnier Tubular Heaters

. . for heating with steam. Product pumped through stainless steel tubes. Steam circulated around outside of tubes. Special controls reduce high pressure steam to low pressure for economical, safe, closely regulated operation. Will heat products of high viscosity such as pumpkin pulp. Well adapted to pasteurizing and preheating applications. Write for Bulletin 164.

◀ Mojonnier Zone-Control Vats

. . for heating with steam or hot water. Heating medium is directed through small channels under pressure at high velocity. Channels are in wall of vat, so that vat interior is one smooth, continuous stainless steel surface. Equipped with specially designed agitators, sanitary power units, simplified steam control. Can also be used to cool, by circulating well or chilled water through channels. Write for Bulletin 191.

Mojonnier HEATING EQUIPMENT

OTHER WORLD-KNOWN MOJONNIER EQUIPMENT FOR FOOD PROCESSING PLANTS: LO-TEMP EVAPORATORS MULTIPLE EFFECT EVAPORATORS • VACUUM PANS • FRUIT SPREAD COOKERS • CONVEYORS • WATER CHILLERS COLD-WALL TANKS • GERMICIDAL FRUIT SCRUBBERS • INTERNAL TUBE COOLERS • VACUUM FILLERS • BEVERAGE CARBONATING UNITS • DAIRY PROCESSING EQUIPMENT

When you can make
better food products at less cost—

YOU POCKET THE DIFFERENCE!

Adds up, doesn't it? And General Mills' new PAYGEL—a *wheat* starch—gives you *superior* products with *less trouble—less cost!* Here's why:

1. Paygel costs compare favorably with imported root starches, and it provides a dependable domestic supply.
2. Paygel does a remarkable job as a fat (emulsion) stabilizer during critical production phases of specialty canned foods such as chili, soups, etc.
3. Paygel is *thick-boiling* starch with excellent absorption, yield. Produces outstanding sols and gels with no cereal taste or odor.
4. Paygel is produced under rigid product and laboratory controls. Backed by the world's largest processor of wheat!

For gum candies use *General Mills B-2455*, another fine *wheat* starch. Highly purified and modified, this starch has a *thin-boiling* characteristic.

Free samples of Paygel and B-2455 are yours without obligation. Discover how these *wheat* starches can increase *your* profits. Write or wire—

General Mills, Inc.

Special Commodities Division

400 2nd Ave. So. Minneapolis 1, Minn. | 208 So. LaSalle St. Chicago 4, Ill. | 80 Broad St. New York 4, N. Y.

William J. Scarlett has been named food industry manager for the Minneapolis-Honeywell Regulator Co.

---

has elected John G. Cherry as president, succeeding the late John W. Ladd. Mr. Cherry is a grandson of founder of company.

Food Machinery & Chemical Corp. is to consolidate its Anderson-Barngrover and Sprague-Sells divisions to form a Cannery Machinery Division. Clifford K. Wilson will head combined groups, and Marlan E. Martin is to be Western section purchasing agent.

Jamison Cold Storage Door Co., Hagerstown, Md., announces opening of a branch facility in Omaha, Neb. A. C. Hoffbauer will be in charge.

Liquid Carbonic Corp. has filled its new office of board chairman, having named P. F. Lavedan, former president. W. A. Brown, Jr., will replace Mr. Lavedan as president.

Packaging Machinery Manufacturers Institute has elected following men: G. Radcliffe Stevens, president; Palmer J. Lathrop and Edwin H. Schmitz, vice-presidents; Mrs. Helen H. Fairbanks, Edwin E. Messmer, and Herbert H. Weber, directors.

Penn Controls, Inc., is new name of former Penn Electric Switch Co. Offices are in Goshen, Ind.

Deaths

James Albert Vogt, manager of Vogt's Bakery, Luray, Va., near Luray in an auto accident—Oct. 31.

Andrew H. Baur, 74, retired president of Baur Flour Milling Co. and former president of Millers Club of St. Louis —Nov. 15.

Samuel H. Berch, president of Arden Farms Co.—Oct. 29 in Beverly Hills, Calif.

David G. Bloom, 59, vice-president of Crown Cork & Seal Co., Baltimore—Nov. 25, in Atlanta.

Frank L. Burrell, 75, retired general manager of Anderson Barngrover Div., Food Machinery & Chemical Corp. and vice-president of FMC, San Jose, Calif.—Nov. 17.

William J. Covington, 62, founder of Vera Milling Co., Appomattox, Va.—Nov. 8, in Vera, Va.

Walter T. Fitzpatrick, 60, assistant vice-president of Borden Co., in New York—Nov. 28.

William J. Foreman, 40, vice-president and sales manager of Haxton Foods, Inc., Oakfield, N. Y.—Oct. 30.

T. Henry Foster, chairman of board of John Morrell & Co., Ottumwa, Iowa—Nov. 14.

John Hekman, 65, president of Hekman Biscuit Co., affiliate of United Biscuit Co.—Nov. 23, in Grand Rapids, Mich.

Irwin W. Klasman, 54, manager of Norfolk office of Swift & Co.—Nov. 12, in Norfolk.

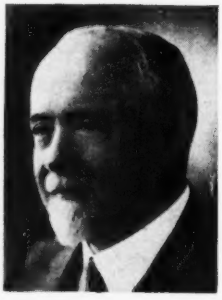
Carl J. Moroney, 65, chairman of board of Spreckels Sugar Co.—Nov. 27, in San Francisco.

Alfred M. Niese, 50, vice-president of the National Sugar Refining Co.—Nov. 20, in Englewood, N. J.

James E. Parks, 40, co-owner of Western Fisheries and Parks Canning Co., Seattle —Nov. 16.

Philip W. Warnke, general superintendent of Camden plant of Campbell Soup Co.—Nov. 18, in Audubon, N. J.

Joseph Wilshire, 72, retired chairman of board of Standard Brands, Inc.—Nov. 17, in Greenwich, Conn.



Henry Richardson, founder of Richardson Scale Co. and chairman of its board, passed away on Dec. 2.

SPARKLING ALCOA FOIL

gets it to the front... FRESH!

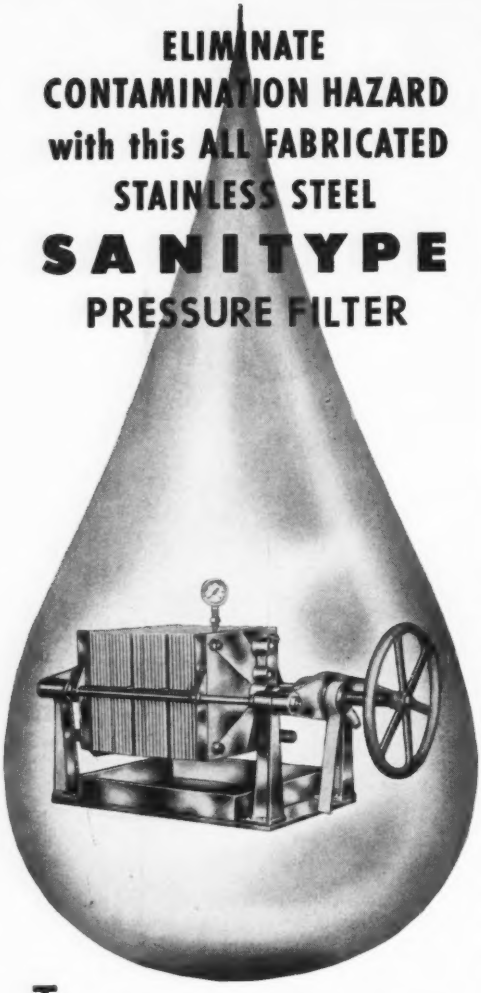
MIGHTY important . . . this foil-lined packet. Part of a soldier's daily combat ration, it includes several necessary things—cigarettes, coffee, sugar, milk, matches.

Guarding supplies like these—from factory to front, is only one of the many ways Alcoa Aluminum Foil serves. Laminated to a wide variety of barrier materials, foil also helps protect delicate electronic equipment, tanks, guns, medical supplies from the hazards of shipping, storage, heat, dust, moisture.

Is Alcoa Aluminum Foil available for packaging *your* product? That depends on current government restrictions. Best qualified to answer this question are leading packaging firms—pioneers in protective packaging, *in Alcoa Foil.* May we send you their names?

Write to: Aluminum Company of America, 1765H Gulf Building, Pittsburgh 19, Pennsylvania.

ELIMINATE
CONTAMINATION HAZARD
with this ALL FABRICATED
STAINLESS STEEL
SANITYPE
PRESSURE FILTER



There's plenty of enthusiasm among processors for this new ALL FABRICATED STAINLESS STEEL filter. The reason is simple. Here you have a filter with *no* porous, pitted or rough surfaces. Every part which comes in contact with liquid is highly polished. Cleaning is easy. It quickly opens and closes. There are no rubber washers . . . and, you may use any type filter pad, paper or cloth. Flexible, too . . . for double filtration.

WRITE FOR CATALOG

Send for your copy of this informative catalog on the various types of HORM filters.

F. R. HORMANN & CO., INC.

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17 STONE STREET • NEWARK 4, N. J.

Northern Glass Company - 118 Sacramento St., San Francisco, Cal.

Recent Inventions

Meat Substitute Made by Mixing Particles of Edible, Solid Texturizing Agent and Dried Milk, Gelled Mixture Having Texture Corresponding to Comminuted Meat Preparations—*C. L. Wrenshall, Jacksonville, Fla. No. 2,560,621. July 17, 1951.*

Recovery of Byproducts From Waste Citrus Liquor By Evaporating, Fermenting in Presence of Yeast, Removing Yeast, Evaporating—*G. T. Reich, Philadelphia. No. 2,561,072. July 17, 1951.*

Reversible Vegetable Gel Produced By Extracting Proteinacious Soybean Residue With Water, Mixing With Alcohol, Heating, Boiling and Cooling—*A. C. Beckel, Peoria, and P. A. Belter, Pekin, Ill., to U. S. A. No. 2,561,333. July 24, 1951.*

Canning and Preserving Fruit and Vegetable Juices by Preheating to 30-40 Deg. C., Holding 10-20 Min., Preheating Cans, Filling, Raising Temperature to 55-75 Deg. C., Holding 10-20 Min., Sealing, Gradually Lowering Temperature, Holding at 20-25 Deg. C. for 10-15 Min.—*J. C. y Garcia, Mexico City, Mexico. No. 2,561,784. July 24, 1951.*

Horseradish Composition Comprising Comminuted Root Mixed with Skim Milk, Vegetable Oil and Homogenizing Agent—*E. I. Huntsinger, Eau Claire, Wis. No. 2,561,797. July 24, 1951.*

Grain Drying Tower With Oscillating Perforated Trays for Agitation—*W. W. Jakubik, Rosenberg, Tex. No. 2,561,925. July 24, 1951.*

Dry Coffee Concentrate Prepared by Introducing Steam to Ground, Roasted Coffee, Condensing Steam and Volatiles, Forming Aqueous Extract of Ground Roasted Coffee, Concentrating the Latter, Mixing With Volatile Extract, Drying—*L. Nutting, Berkeley, Calif., to Hills Brothers Coffee, Inc., San Francisco. No. 2,562,206. July 31, 1951.*

Spray Drying Apparatus Consisting of Vertical Circular Chamber With Baffled Air Feed Duct Which Imparts Circular Motion to Plurality of Air Streams—*J. J. Mojonnier, Winfield, Ill., to Mojonnier Brothers Co., Chicago. No. 2,562,473. July 31, 1951.*

Modified Protein-Comprising Product Resulting From Reaction Under Aqueous Alkaline Conditions of Protein and Compound Selected From Group Consisting of Acrylonitrile and Methyl Acrylate—*J. R. Coffman, St. Paul, Minn., to General Mills, Inc. No. 2,562,534. July 31, 1951.*

Improved Nut Butter Made by Dispersing Melted Hydrogenated Fat in Nut Butter, Cooling Rapidly to Obtain Crystallization of Fat, Agitating the Dispersion, Storing Below Beta Crystallization Temperature—*P. J. Mitchell, Griffin, Ga. No. 2,562,630. July 31, 1951.*

Apparatus for Evaporating Whey Comprising Plate-Type Heat Exchanger and Evaporating Vessel Connected in Series, Steam From Evaporating Space of Latter Being Used as Heating Medium in Exchanger—*J. V. M. Risberg, Ostertalje, Sweden, to Aktiebolaget Separator, Stockholm, Sweden. No. 2,562,739. July 31, 1951.*

Soluble Coffee by Solvent Extracting Fresh Roasted Ground Beans, Fractionating by Molecular Distillation, Adding Hot Water Extract of Grounds to Aroma Portion — *R. Gilmont, Brooklyn, N. Y. No. 2,563,233. Aug. 7, 1951.*

Frozen Confections Formed by Pulsation Feed of Metered Mix Into Tubular Casing and Sealing Into Individual Closed Bags—*I. A. Rummel and J. D. Welch, Oakland, Calif. to Henningson Products Co., Federal Inc. U.S.A., a China Trade Corp. No. 2,563,278. Aug. 7, 1951.*

Apparatus for Continuously Freezing Packaged Foods Consisting of Moving Conveyor in Temperature-Controlled Chamber—*H. J. Bierman, Chatham, N. J. to Ingersoll-Rand Co., New York. No. 2,563,576. Aug. 7, 1951.*

Hydraulic Element for Exerting Pressure on Rolls of Cane Sugar Mill—*T. M. Nalon, Derby, Conn. to Farrel-Birmingham Co. Inc., Ansonia, Conn. No. 2,563,690. Aug. 7, 1951.*

Citrus Juice Process Consisting of Lime Addition, Heating by Submerged Flame to Precipitate Calcium Citrates and Pectinates, Separating, Reprecipitating and Evaporating — *E. M. Burdick, Weslaco and J. S. Allen, McAllen to Texsun Citrus Exchange, Weslaco, Tex. No. 2,563,705. Aug. 7, 1951.*

Rancidity in Rice Bran and Polish Retarded by Treating With Live Steam at 212 deg. F., Further Heating Above 212 deg. for 4.5 Min. to Assure Penetration—*H. L. Burns and M. M. Cassidy, Houston, Tex. to American Rice Growers Coop. Assn., Lake Charles, La. No. 2,563,798. Aug. 7, 1951.*

Automatic Baking Machine Containing Rotating Table on Which Molds of Product Pass Through Oven Area—*H. Puls, New York. No. 2,563,866. Aug. 14, 1951.*

Quick Freezing Machine for Rectangular Packages has Four Re-

frigerated Wall Tunnels With Track and Convevor Integrated in a Wall—*C. L. Kirk, Bozeman, Mont.* ½ *to G. H. Ballantyne, San Jose,* ½ *to R. M. Magnuson, Campbell, Calif. No. 2,563,938. Aug. 14, 1951.*

Crystal Starch Made by Filtering Slurry, Forming Cake Into Continuous Elongated Mass, Vibrating to Predetermined Cross-Section, Then Drying—*A. M. Krattebol, Chicago and A. Cooke, Clarendon Hills, Ill. to Corn Products Refining Co., New York. No. 2,563,942. Aug. 14, 1951.*

Automatic Hamburg Patty Machine Consisting of Hopper Delivering Measured and Shaped Portion—*H. H. Holly, Chicago. No. 2,564,064. Aug. 14, 1951.*

Soluble Beverage Prepared by Mixing Lecithin With Dry Coffee Extract, Liquid Coffee Extracts, Heating and Drying—*J. L. Kellogg (deceased) H. L. Kellogg, executrix, Chicago. No. 2,564,323. Aug. 14, 1951.*

Processed Cheese Made by Adding Water-Insoluble Melting Salt and Water Soluble Alkali-Metal Salt to Cheese, Admixing, Mass, Melting and Casting—*C. T. Roland, to Hall Laboratories, Inc., Pittsburg. No. 2,564,374. Aug. 14, 1951.*

Apparatus for Dehydrating Frozen Foods Consisting of Vacuumized Product Chamber and two External Heat Exchangers Which Recirculate Compressed Atmosphere Over Frozen Food—*L. J. Fischer, Marblehead, Mass. to General Electric Co., New York. No. 2,564,475. Aug. 14, 1951.*

Continuous Butter Machine Consisting of a Cylinder with Two Oppositely Rotating Disk-Bearing Agitators—*C. E. North, Montclair, N. J. No. 2,564,715. Aug. 21, 1951.*

Cheese Flavor Imparted to Baked Goods by Incorporating Leucine and Mild Cheese to Leavened Dough and Fermenting—*P. Kass, Great Neck, Long Island to Interchemical Corp. New York No. 2,564,763. Aug. 21, 1951.*

Nut Meat Blanching Machine Consisting of Rotating Wheel Having Nut Bearing Chambers With Means for Turbulent Air Injection — *C. T. Nemir, to K. N. H. Corp., Washington, D. C. No. 2,564,916. Aug. 21, 1951.*

Producing Sweetened Condensed Milk by Heat-Treating From Approximately 265 to 310 deg. F. Without Browning, Adding Sugar to Saturation and Concentrating to 70 to 75 Percent Solids—*D. D. Peebles, Hillsborough, Calif. to Golden State Co., Ltd., San Francisco. No. 2,565,085. Aug. 21, 1951.*

Plastic Type Milk Product Containing 30 to 60 Percent Water, 10 to 40 Percent Lactose, Part Dissolved and Part Crystalline, and Milk Solids in Quantity Less Than ½ of Lactose—*P. F. Sharp, Piedmont and W. H. Hoecker, Orinda, Calif. to Golden State Co. Ltd., San Francisco. No. 2,565,098. Aug. 21, 1951.*

Oil and Food Products Made From Herrings, Whales and Other Sea Animals by Heating in High-Temperature Steam to Extract Oils and Solubles, Separating Oil, Evaporating Water Extract in Number of Stages Until Steam Distillate is Pure and Can be Used for First Heating Operation—*M. Fladmark, Oslo, Norway. No. 2,565,173. Aug. 21, 1951.*

Meat Press Consisting of Movable Top Semicylindrical Die and Stationary Lower Die With Hydraulically Driven Piston to Force Meat Into Desired Shape — *M. Lebovitz, to Churchill Meat Co., Pittsburg. No. 2,565,245. Aug. 21, 1951.*

Whole Fresh Eggs Continuously Pasteurized by Flash Heating to 138-150 deg. F., Further Heating in a Thin Layer, Holding for 2-30 Min., Then Quickly Chilling—*C. H. Koonz and F. L. Kauffman, to Swift and Co., Chicago. No. 2,565,311. Aug. 21, 1951.*

Electrostatic Food Smoking Device With Grounded Electrode Utilized to Support Food—*K. W. MacKenzie, Newton Highlands and G. E. Andrews, Andover, Mass., to Raytheon Manufacturing Co., Newton, Mass. No. 2,565,454. Aug. 21, 1951.*

Dehydrated Starchy Food Product by Removing Moisture Until Weight is Reduced 15 Percent, Then Cooking—*G. Barsky, London, England and E. Rivoche, Washington, D. C. to E. Rivouche. No. 2,565,942. Aug. 28, 1951.*

Candy Bar Forming-Machine Consisting of Hollow Slab With Fluid Circulation for Temperature Regulation, and Movable Carriage of Transverse and Longitudinal Cutting Blades—*F. E. Soell, Estondale, Mass. No. 2,566,586. Sept. 4, 1951.*

Preparing Dried Fruit Juice by Raising pH With Alkali, Heat Treating, Low Temperature Evaporation to 75-90 Percent Solids, Suspending on Granulated Sugar and Dehydrating—*J. W. Stevens, Upland, D. E. Pritchett and W. Baier, Ontario, Calif. to California Fruit Growers Exchange, Los Angeles. No. 2,567,028. Sept. 4, 1951.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

CAN SeaKem* "Colloids Out of the Sea" IMPROVE YOUR FOOD PRODUCT?

Typical Food Items SeaKem Products Can Help Improve

- Aspics
- Beer
- Beverages
- Cake Icings
- Canned Fish and Meat
- Canned Fruit
- Canned Poultry
- Catsup (Imitation)
- Cheese Spreads
- Chocolate Milk
- Chocolate Syrups
- Confectionery
- Dehydrated Soups
- Dessert Mixes
- Flavoring Emulsions
- French Dressing
- Frozen Fish
- Frozen Fresh Fruit
- Frozen Fruit Juices
- Fruit Fillings (Pie)
- Fruit Juices
- Fruit Syrups
- Glazes
- Ice Cream
- Marshmallow Toppings
- Meringues
- Milk Puddings
- Pet Foods
- Pie Fillings
- Pie Mix (Prepared)
- Pumpkin Pie Mix
- Ripple Ice Cream
- Salad Dressings
- Sausages
- Sauces (Prepared)
- Sherbets
- Soluble Coffee
- Syrups
- Tomato Juice
- Water Gel Desserts
- Whipped Cream

Recent application developments are fast making it apparent that SeaKem "Colloids Out of the Sea" offer countless new opportunities for improving a wide variety of food items (see typical list on left).

In addition to being employed profitably for scores of gelling, binding, bodying, thickening, suspending and stabilizing purposes, SeaKem Products are now being used to improve mouth-feel and flavor . . . increase the efficiency of component ingredients . . . and achieve unique end-product advantages.

Also of growing interest are such developments as the use of SeaKem Products to protect frozen foods from oxidation . . . modify ice-crystal growth in fruits . . . custardize milk and products containing milk solids . . . create thermally-reversible gels . . . and precipitate proteins in processing.

If you are not up to date on how SeaKem "Colloids Out of the Sea" can help improve your food product, your inquiry for the latest Seakem Technical Bulletins is invited. Write today, mentioning the type products and problems with which you are concerned.

FREE SAMPLES FOR YOUR APPRAISAL

Working samples of SeaKem Products for your own laboratory investigation will be gladly supplied on request. Or if you prefer, SEAPLANT Chemical Corporation's Laboratory (where a continuous research program on colloid agents is carried on) will undertake to develop specific recommendations for you — *in complete confidence and without obligation or cost.* Write today.

* SeaKem is the trademark for the standardized, water-soluble, sea plant extractives manufactured by the SEAPLANT Chemical Corporation. Refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem "Colloids Out of the Sea" are light amber to colorless, free-flowing flaky powders. Odor and flavor are extremely slight or entirely absent. Available in a variety of types suitable for use in an unusually wide range of applications, SeaKem Products have won acceptance on the basis of proven advantages with many of this country's leading food manufacturers and processors.

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FRESH ON ARRIVAL

. . . 35 Million Pounds of Frozen Poultry Annually!

"FRUEHAUF reefers are our guarantee of freshness on arrival," says Mr. Gilbert Swanson, President of the C. A. Swanson & Sons Company of Omaha, Nebraska, world's largest processor of frozen poultry.

"We process around 165,000 chickens each day," continued Mr. Swanson, "and when we close the door on a Fruehauf Refrigerated Trailer, we know our product will arrive on the market carrying the same 'bloom' of freshness it had when we packed it."

The cold-retaining qualities of Fruehauf Refrigerated Vans are the result of superior engineering "know-how" and are your guarantee of goods delivered at the right time and at the right temperature.

The superiority built into Fruehauf reefers is reflected in every other Trailer in the broad Fruehauf line. If a standard Fruehauf won't fill your bill, we'll custom build you one that will.

"UP AND OVER THE HILLS ONE GEAR HIGHER," says driver Joe Bell. This money-saving feature is the result of Fruehauf's exclusive integral-frame construction and Gravity Tandem Suspension combining to give Swanson larger payloads hauled faster, safer and cheaper.

"50,000 MILES AND HARDLY A SIGN OF WEAR," says Jack Traner, Ass't. Fleet Manager. Fruehauf Gravity Tandem axles eliminate abnormal tire wear and are giving users up to four times ordinary tire life.

FRUEHAUF REEFERS FEATURE product-protecting insulation in thicknesses from 3" to 7½" for constantly holding temperatures from 30 above to 10 degrees below. Moisture-resistant Ultralite Fiberglas is feather-light but made with a toughness that withstands rodents, bacteria, odor, fire and rot.

New catalog illustrates and describes the complete line. A copy is available to you free upon request. Write Fruehauf Trailer Co., 10941 Harper Ave., Detroit 32, Michigan.

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New Catalogs and Bulletins
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Food Plant Equipment

Water Conditioning Equipment
Listed in leaflet are mono-bed, 4-column softener and silica removing demineralizers, along with water softeners, deaerating heaters, degassifiers, water filters, and water storage tanks. Each item is briefly described and pictured. —*Penfield Mfg. Co., Inc., Meriden, Conn.*

Air Filter
A filter designed for most effective removal of dust, smoke, fumes, spores, radioactive particles, and other microscopic foreign matter from air is described in 4-page illustrated folder. Filters are produced in five sizes from 15 to 850 cfm. Life expectancy with proper pre-filtering is estimated at 1-3 yr.—*Cambridge Corp., 350 S. Geddes St., Syracuse, N. Y.*

Precision V-Belts
Describing new Condor V-belts' precision balance and "more grip, less slip" features, new 4-page bulletin depicts installations. Table of standard industrial sizes and prices are included.—*Ravbestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.*

Double-Pitch Roller Chains
New roller chains of double-pitch type are stated to bring weight reductions in drives and conveyors. They are detailed in 12-page Bulletin 51-2. Numerous charts, photos, diagrams, and tables are included, also a description of double-pitch chain sprockets.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

Ammonia Compressors
Handsomely styled Bulletin 112-I, titled *Ice and Frost*, depicts latest features of enclosed ammonia compressors. These have cylinder sizes from 3x3 in. to 17½x12 in. Special features: Force-feed oiling systems, ring-plate cylinder valves, outboard barings, capacity controls (or dual-pressure operation when desired), over-size bearings, etc. Profusely illustrated, 18 pages.—*Frick Co., Waynesboro, Pa.*

Control Cylinders
Several advanced installations of process control cylinders are illustrated in 4-page Bulletin 152, which points to use of the devices for reducing or eliminating manual operations.—*Ledeen Mfg. Co., 1600 S. San Pedro St., Los Angeles 15.*

Steel and Plate Fabrications
Engineering facilities available for fabrication of tanks, kettles, towers, reactors, and similar equipment, are described in 8-page bulletin. Tables and charts outline maximum dimensions, also show range of plate thicknesses in various alloys, and test pressures available for air and hydrostatic checks. —*Colonial Iron Works Co., 17631 St. Clair Ave., Cleveland.*

Valve Manual
Multi-colored sheet discusses publication of revised and enlarged manual—170 pages loose-leaf—detailing valves of 18 manufacturers by material, type, pressure rating, structural variations. It is stated manual will reduce valve-specification checking time, since there will be over 50,000 postings of figures, names, and data, as well as size listings for cast iron and bronze valves. Expected publication date: Jan. 20 —*Equivalent Valves Co., Box 816, Station H, Los Angeles 44.*

Control Equipment

Helipath Stand
When used with suitable viscometer fitted with a special bar-type spindle, helipath stand discussed in data sheet 051 will make consistency measurements of relative centipoise values of materials, such as gelatine, wax, etc. 2 pages. —*Brookfield Engineering Laboratories, Inc., Stoughton, Mass.*

Control Systems
Details of automatic all-electronic instrumentation in control systems for use in food processing plants is treated in catalog. Unit is said to be first centralized control, miniature, all-electronic system for measuring and controlling process variables, such as temperature, pressure, level and flow.—*The Swartout Co., 18511 Euclid Ave., Cleveland 12.*

Level Liquid Gages
Premote reading gages which bring liquid level readings down to the operator's floor or control panel for easy reading are covered in 8-page Bulletin No. 176. Three standard models are shown and briefly described.—*Jerguson Valve & Gage Co., Somerville 45, Mass.*

Controllers, Control Stations
Bulletin 5011 carefully displays controllers, control stations and

Quality products command better prices! You get better color, better taste . . . and more uniform quality with this money-saving, time-saving unit that will *pasteurize, hold* and *cool* products packaged in jars, bottles and cans, and which are processed—due to their nature—in their final containers. Remember . . . pasteurized products are "profit" products! Get the facts.

If you pack **PICKLES, JAMS, JELLIES, JUICES** and similar products, send for **FREE** bulletin. Tells how you can improve quality, taste and color . . . with controlled cooling.

Ask for Bulletin No. JC-1

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Stew kettle or pump . . . it's what's inside that counts! Inside a WATEROUS 100% Sanitary Pump you'll find a one-piece rotor and shaft . . . a lubricated gear case (completely separate from pumping chamber) . . . steel gears . . . fixed internal clearances. Available in capacities up to 100 GPM—pressures up to 125 lbs.

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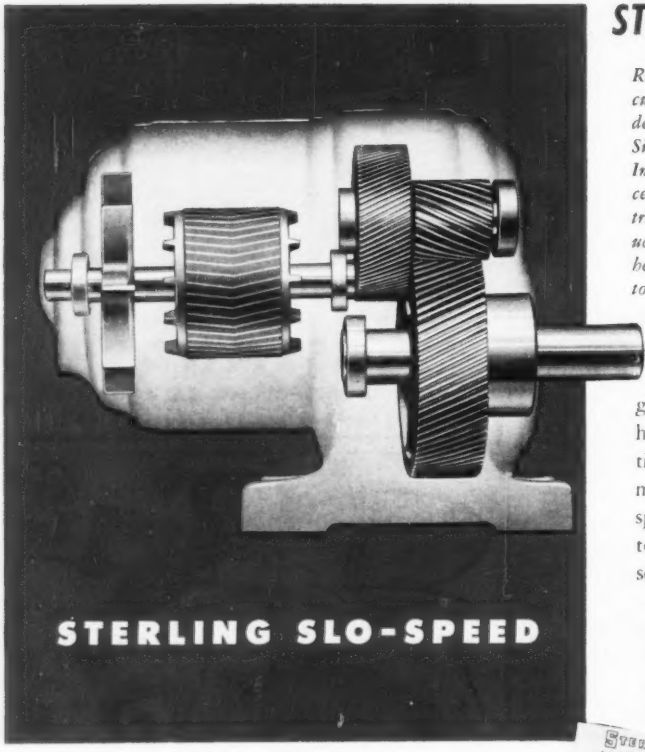
HIGHER EFFICIENCY FOR CONTINUOUS DUTY WITH



STERLING SLO-SPEED!

Rugged construction of Slo-Speeds assures our customers efficient continuous operation under difficult conditions, states Mr. Robert A. Sindall, Jr., President of A. K. Robins & Co., Inc., Baltimore, manufacturers of food processing equipment. Streamlined design contributes to high quality of our finished product—makes cleaning easier. Slo-Speeds have helped us produce canning equipment second to none.

STERLING SLO-SPEED GIVES YOU THE ONE BEST LOW SPEED AND

gives uninterrupted service—carries heavy overhung loads—provides versatile mounting and flexibility in arrangement of machinery—saves valuable space—provides greater safety—costs less to install and use. An indispensable source of low speed power for:

Agitators	**Dryers**	**Presses**
Blenders	**Feeders**	**Pumps**
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Cookers	**Mixers**	**Etc., etc.**

OTHER STERLING ELECTRIC POWER DRIVES:
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70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. D-122

OUTSTANDING FEATURES:

Simplified gear system—balanced design—compact—rugged—highly efficient—abundant lubrication—low output shaft—positive oil seals—Herringbone Rotor—protected—streamlined—direct through ventilation—quiet operation—AGMA speeds—extremely long life—every unit will operate in any position.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile.
Offices and distributors in all principal cities.

derivatives.—*Moore Products Co., Philadelphia 24.*

Servomechanism Methods

Technics are offered in Bulletin G-56 for improved process control and economical process design. Basic information is given on analysis of automatic regulation problems in industrial instrumentation. Advantages are discussed. 24 pages.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Flame Photometer

Optical instrumentation to assist orange production is revealed in recent Fall edition of *Instrument News*. Information covers chemical, biological, and physical conditions of orchard soil as brought out by flame photometer.—*Perkin-Elmer Co., Norwalk, Conn.*

pH Measure

Simplicity is reported in measuring degree of acidity or alkalinity of a solution with new scale instrument. Maker states it is unnecessary for operator to be skilled in pH data when using scale. Emphasized is particular value of unit to dairy industry.—*Ramsey Laboratories, Inc., Lisbon Rd. & Evins Ave., Cleveland 4.*

Pump Dispenser

Unit known as Carboypump is designed for safe dispensing of solvents, acids, alkalis, and liquid organic materials from glass, rubber, and metal containers. Density of liquid reportedly has no effect on smooth operation.—*Laboratory Industries, Inc., 4710 W. North Ave., Chicago 39.*

Recording Thermometers

Specification sheet of 4 pages describes indicating and recording thermometers. Construction and engineering details are included. Units are available as indicators with eccentric scales, and as one-, two-, or three-pen recorders.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Materials Handling

Four-Purpose Carriage

As reported in Bulletin 1350-1, fork truck attachment provides (1) standard fork use, (2) clamp action, (3) fork spacing for different load widths, and (4) side-shifter action. Photos and drawings show how to change carriage from a fork base to a side-shifter to give a four-way carriage.—*The Baker-Raulang Co., Cleveland 2.*

Trucks, Accessories

Illustrated booklet shows the number of axles and transmissions per truck, axle housings, plus a broad line of industrial towing tractors, fork lift trucks and attachments, powered hand trucks, and other equipment. 32 pages.—*Clark Equipment Co., Buchanan, Mich.*

Electric Fork Trucks

Electrically operated fork trucks comprise primary subject of 12-page Bulletin 5143. Those shown have 2,000 to 4,000 lb. capacity. Descriptions include data on dimensions, speeds, motors, and various drive units. — *Barrett-Cravens Co., 4615 S. Western Blvd,. Chicago 9.*

"Inside" Fork-Truck Story

Cleverly cartooned 36-page bulletin offers non-technical analysis of construction features of fork truck equipment. Titled *What Makes It Tick?*, publication notes features such as forced feed lubrication, mechanical governor, and balanced carburetor. Also analysis is extended to broader picture of body, mast, and styling.—*Towmotor Corp., Cleveland 10.*

Fork-Truck Utility

Material Handling News, Vol. 10, No. 2, carries reader through various phases in plant use of fork trucks. Pictorial outline begins with receiving, continues through storage, processing and assembly, and warehousing, and finally covers shipping. Additional folder describes role of fork trucks in recent Kansas City flood.—*Clark Equipment Co., Battle-Creek, Mich.*

Conveyor Belt

Manufacturer states new general-purpose heavy duty conveyor belt is designed to avoid tearing or puncturing of materials. Applications are seen specially suitable where small pulleys are used, where more flexibility is required, and where thick, narrow belts are needed. Conveyor is designated Ray-Man "F." 4 pages.—*Raybestos-Manhattan, Inc., Passaic, N. J.*

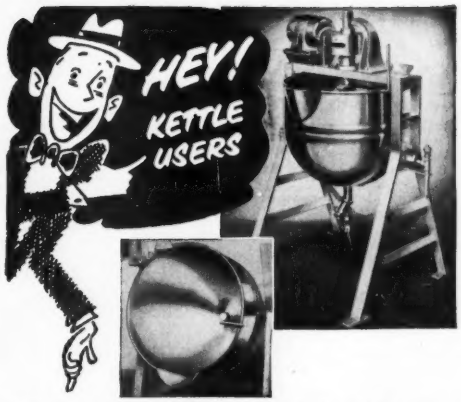
Plant Supplies

Anti-Dirt Enamels

Lipstick, ink, grease, mercurochrome, and other staining agents, are easily washed off new enamels without trace, according to manual titled *How to Reduce Your Maintenance Painting Costs.* Available are flat, semi-gloss, and high-gloss enamels in non-yellowing white and eye-rest colors.—*Enterprise Paint Mfg. Co., 2845 S. Ashland Ave., Chicago.*

Fly-icide

Folder concerning use of combination of pyrethrins and piperonyl butoxide for fly control cites finding by F&DA that this insecticide is not objectionable from the health standpoint. Both



Here's the new Hamilton Tilting Type Mix-Cooker which has every feature of the regular Tilting Kettle PLUS the added feature of a bottom draw-off valve. Products being cooked can be drained off either through rim lip or through bottom valve; depending on viscosity of product.

The steam jacket on this Hamilton Tilting Kettle covers ⅗ of kettle area. Fabricated in stainless steel in gauges required by ASME Code or heavier. This kettle is available with single or double motion agitator with maple or nickel alloy scrapers—plus a Hydraulically lifted agitator arm. Any combination available upon specification.

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Perhaps your problem is handling packages on an incline of 25—even 35—degrees. You'll find the solution in Thermoid "Ruff-Top" Conveyor Belting—with its thousands of small, rough, irregular-shaped points of soft rubber that take a firm grip on the lightest packages or cartons.

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Thermoid's extra margin of endurance means fewer delays due to belt breakage or premature wear.

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Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled . . . how to determine capacities, speeds, weights and number of plies.

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farmers and milk plants are said to have found product satisfactory.—*U. S. Industrial Chemicals Co., 60 E. 42nd St., New York.*

Sorbitol in Foods

Section in 22-page bulletin on general uses of sorbitol deals with its specific uses in foods. Described are agent's high humectant properties and several characteristics for increasing product shelf-life.—*Atlas Powder Co., Wilmington 99, Del.*

Industrial Tape

Applications for industrial tape —1,500 in all—are outlined in 80-page manual just released. Uses are designated by topics, such as Appliances, Bags, Meating Packing, Ice Cream, etc. Publication is titled *Polyken Standard Industrial Classification Manual.*—*Polyken Industrial Tape, 222 W. Adams St., Chicago 6.*

Anti-Rust Paint

Special new paint product, states Bulletin 136-11, can be applied on rusted surfaces without need for wire-brushing, scraping, or sandblasting, thus saving time and labor. Black, aluminum, or clear, it can be put on by brush, dip, or spray methods.—*The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6.*

Anent Chromium Stainless

Two companion publications discuss where to use No. 17 chromium stainless and its fabrication. First discloses various properties of metal, care to give it, and normal and alternate uses. Also, questionable practices are noted. Second gives fabricating procedures, showing typical changes in die practice and weld microstructures. Tables list mechanical properties of fusion welded joints and spotwelds.—*Armco Steel Corp., Middletown, Ohio.*

Bottle Washing

Two pocket-size folders are concerned with procedure for getting clean, bright, and film-free bottles. Method is primarily applicable in dairies, milk plants, creameries, bottling plants, and breweries.—*Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14.*

Rubber-Sheet Packings

Bulletin of 8 pages describes rubber sheet packing for diverse machine and equipment applications. Service recommendations are provided for each type of sheet. Standard thicknesses, weights per square yard, and how material is shipped, are facts included.—*Raybestos - Manhattan, Inc., Packing Div., Manheim, Pa.*

Industrial Labels

Numerous ideas on effective use of labels are offered in 24-page bulletin. Technics for style, flexibility, and dramatic impact are set forth.—*Ever Ready Label Corp., 357-363 Cortlandt St., Belleville 9, N. J.*

Miscellaneous

Asphalt Mastic Floors

Floorings that save manpower in installation comprise subject of new 4-page bulletin. Asphalt mastic is product, stated to provide warmth and resilience, and described as water, fire, acid, and vermin resistant.—*The Tremco Mfg. Co., Cleveland.*

Floor Resurfacing

Material for resurfacing floors, claimed to be stronger than concrete and resistant to oil, grease, acids, and moisture, is recommended in Bulletin L-4581.—*Paramount Industrial Products Co., University Center Station, Cleveland 6.*

Noise Control

Pamphlet illustrates principle of noise measurement and discusses relation of objectionable sound to human ear. It is pointed out how elimination of noise increases efficiency, improves employee morale, and betters public relations.—*Industrial Acoustics Co., 333 Jackson Ave., New York 54.*

Copy Machine

Just introduced is new copy machine for reproducing drawings and written, typed, or printed matter. Added feature is ability to reproduce various color combinations: Black, brown, red or blue lines on white, pink, blue, green or yellow paper. Maker says unit is easy to operate and quiet in action. Booklet A-2009, 4 pages. —*Charles Bruning Co., Inc., 100 Reade St., New York 13.*

Welding, Cutting

Attractively colored 63-page catalog presents illustrative material on welding and cutting equipment, including torches, adapters, bushings, repair tools, safety valves, gages, and control valves. Catalog 20-C.—*Victor Equipment Co., 844-54 Folsom St., San Francisco 7.*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature" —each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom, and mail. No postage needed.

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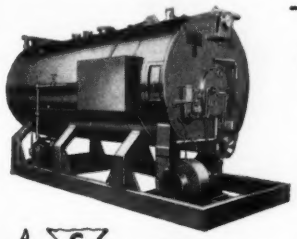

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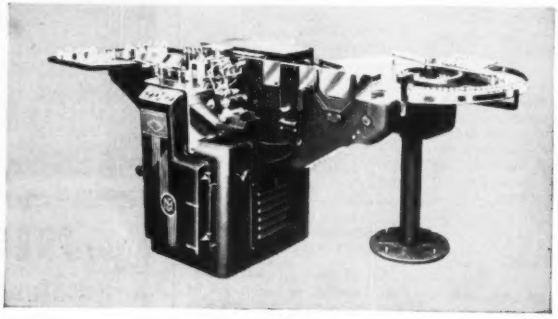
of unique design and principle. A high speed fully automatic body labelling machine for cylindrical containers. Fitted with *"No Bottle – No Label"* device.

Precision labeling from 100 to 800 dozen per hour using one label stack only. The "Banks" Labeler is simple to operate, occupies very little space, and positions the labels positively, accurately and without any trace of surplus gum beyond the edges of the label, irrespective of the label shape or size. Change from one size of container to another is obtained in a matter of seconds. Cleaning down takes only a few minutes. Model BLMD will fix labels both sides. Model BLM 3 will fix the label all around bottle or jar.



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CONCENTRATED APPLE JUICE
Full Natural Flavor
No Artificial Color or Preservative
Samples and Prices on Request
GEORGE A. JEFFREYS & CO.
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Proper Temperature for Frozen Foods

CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

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The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A. M. January 25th at the New York Office, 330 W. 42nd St., New York 36, N. Y., will appear in the February issue subject to limitations of space available

FOUNTAIN SUPPLIES CRUSHED FRUITS, SYRUPS

Wanted

Experienced working foreman who can formulate and produce quality line of Ice Cream and Fountain Supplies. Location New York City. Our company is well known for many years as Food Processor of related lines and plans now to add Fountain Supplies to its production program. Replies will be kept confidential and should include complete resume of personal qualifications and experience, also salary expected.

P-2439, Food Engineering
330 W. 42 St., New York 36, N. Y.

Production Manager

Excellent opportunity for aggressive man to take charge of processing division in old line food company in Boston area. Prefer man experienced in chemical, food, confectionery, dairy or similar industries. Require Industrial Engineering degree or experience, in addition to production supervision experience. Unlimited future for a creative thinker who is aggressive and has a sound knowledge of scientific management principles. Give full details including salary desired in first letter.

P 2820, Food Engineering
330 W 42 St., New York 36, N. Y.

WANTED ENGINEER

for small food machinery manufacturer. Small, well established company, successful in designing and manufacturing machinery for food processing; needs services of engineer with broad experience and successful record designing machinery, handling men, and as general production engineer. This is an excellent opportunity for a fully qualified person looking for opportunity in small company in Midwest.

P-2882, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

Due to expanding business, we have openings at present for:

- PLANT SUPERINTENDENTS
- DIVISIONAL SALES MANAGERS
- OFFICE MANAGERS
- ACCOUNTANTS
- AND OTHER POSITIONS IN THE MANAGEMENT

Products manufactured and sold are margarine, salad dressings, cucumber wafers, prune juice and peanut butter.

Address in writing, your reply to Mr. Stephen J. Bartush, president, Shedd-Bartush Foods, Inc., 14401 Dexter Boulevard, Detroit 6, Michigan. Give in first letter, age, marital status and full detail of your past experience, territories covered, etc.

No personal interviews granted until arranged for.

P-2829, Food Engineering
520 No. Michigan Ave., Chicago, Ill.

DESIGN ENGINEER

Food Machinery Engineer (Age about 35) wanted for design and development on filling machine and allied lines. Previous experience in similar work required. Program of expansion with well-known manufacturer offers opportunity for responsibility and exercise of creative ability. Company has excellent program of employee benefits. Submit resume of experience to:

P-2489, Food Engineering
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SELLING OPPORTUNITY OFFERED

MANUFACTURERS AGENT. Some exclusive territories available. "Ronningen" quick coupling non-short-circuiting water filters. 50 to 5000 GPM. Pressures to 200#. Excellent opportunity for engineering salesman handling pumping machinery or heavy industrial equipment. Liberal commission basis. Ronningen Mfg. Co., Vicksburg, Michigan.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

FOOD CHEMIST-Production Manager. Age 35, B.S. degree. Nine years experience in food manufacturing including new product development. Presently production manager for food company in confectionery field. Married; family. PW-2836, Food Engineering.

FOOD TECHNOLOGIST: Experienced production supervision, also product and process development, wants position in production, or related. Experience includes canned and frozen foods, bakers' and fountain supplies, ice cream. Excellent technical background, M.S. plus. Age 40, married, family. PW-2840, Food Engineering, 520 N. Michigan Ave., Chicago.

FROZEN FOOD Plant manager, age 41. Fifteen years experience, production, quality control, sales. East preferred. Available February 1. PW-2676, Food Engineering.

PLANT MANAGER: 24 years experience in Plant lay-out, Purchasing, Manufacturing, Costs, Quality Control of Jams, Jellies, Syrups, Sauces, Fountain Supplies, Mayonnaise, Canned Fruits, Vegetables, Meats, Soups, Poultry etc, wants position in California, prefer Bay Area. Salary secondary. PW-2805, Food Engineering.

PRODUCTION-SALES—position desired. Unusual background and excellent experience in Food Technology, quality control, product engineering. M.S. degree. Complete Resume furnished on request. PW-2702, Food Engineering.

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Employers Should Have Some Benefits Too!

With that in mind busy food executives find that my files are invaluable to them when they consult me for that particular expert they want.

Your requests for personnel are given careful and interested attention. Applicants are only submitted on the strength of their proved worth and investigated background.

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Qualified Employment Agency

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JR. AND SENIOR

NUTRITIONIST Ph.D., expert.....to. $15000
"Formula" feeds as against "unmixed". Good personality.
CHEMIST—some "chocolate" exp.....$ 5000
Call, write or wire:—Gladys Hunting (Consultant)

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7 W. Madison St. Chicago 2, Ill.

POSITIONS WANTED

PRODUCTION MAN—Experienced in Production and Management including personnel, Purchasing costs, stores, production controls, methods, manufacturing and packing. Present position is as superintendent. 25 years experience in foods including candy manufacture. Employed up to 400 persons. Chicago and vicinity. PW-2862, Food Engineering.

BUSINESS OPPORTUNITY

For Sale or Lease.

Immediately available. Brick building, two floors, about 40' x 140'. Large lot. Michigan Central siding. Ideal for small food processing plant. Equipt with 100 H.P. water tube, oil fired boiler. Large refrigerator. Located directly adjacent Michigan's largest producing area of small and large fruits. Address: Dowagiac Chamber of Commerce, Dowagiac, Michigan.

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CONSULT: Z. H. POLACHEK.
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PLANT FOR SALE

Newark, N. J. Three-story brick building 71,000 sq. ft. Brick garage 10,000 sq. ft. Buildings—sprinkler throughout—2 freight elevators—heating system—loading dock 185 ft.—yard 6,000 sq. ft. 3 steam engines @ 550 K.W., 110 V.D.C.—two Diesels 20 and 40 K.W.—Boiler #1 @ 750 BHP, Boiler #2 @ 900 BHP, 160 lb. rtd. cpty. each. Softest water in state, low taxes, plentiful local labor, easily accessible to varied communities. Only substantial inquiries invited.

BO-2774, Food Engineering
330 W. 42 St., New York 36, N. Y.

EXCELLENT REBUILT & GUARANTEED UNION MACHINERY

Rebuilt Machinery — Established 1912

At A Fraction Of The Original Cost

International Stainless Steel Straight-line Vacuum Filler, with Automatic Feeder, 160 per minute.
Resina S and LC Automatic Cappers.
Chisholm Ryder New Way Model ; Wraparound Labeler.

Consolidated 13" Macaroni Presses for long goods.
Battery of Grimolas, and Macaroni Dough Mixers.
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Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Day and Robinson 100, 2400, 4000 lbs. Dry Powder Mixers and Sifters.

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Day, Ross Pony Mixers; 8 and 15 gal. caps.
B-P type 3500 gal. S. J. Double Arm Mixer.
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Baker Perkins 200 gal. Unidor Steam Jacketed Double Arm Mixer.
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FOR SALE:

Food manufacturing and distributing business in middle west. We are retiring from business after approximately 25 years, with a sales volume of $350,000.00 per year. Can sell to suit your terms.

BO-2426, Food Engineering
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FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. — BA 7-1819

WANTED

TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
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FOR SALE

LOUDEN SUPER TRACK

37' STRAIGHT TRACK — 2 180° CURVES
10 SWITCHES — 4 90° CURVES
OTHER SPECIAL CURVES

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COURSES IN FOOD TECHNOLOGY

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GENERAL STUDY OF COOKING
PREPARATION OF SALADS
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MEN OR WOMEN
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DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Forelodies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

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FOR IMMEDIATE DELIVERY

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PNEUMATIC SCALE CO. 35 Per Minute.
AUTOMATIC CARTONING LINE
Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.

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CARTONING LINE consisting of Automatic Feeder, Bottom Sealer, 4 Scale Net Weight Filler, Top Sealer, Compression Unit and Sheet Feed Transwrap.
J. L. FERGUSON PACKOMATIC HIGH SPEED (70 Per Minute)
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STOKES & SMITH Model G Transwrap with Auger Fillers.
STOKES & SMITH Model HG84 Fully Automatic Auger Filler with Vacuum Attachment. Also Models G and GD Semi-Automatic.
PNEUMATIC SCALE CO. 10" Simplex Labeler.
PNEUMATIC SCALE CO. 4" Duplex Front and Back Labeler.
KARL KIEFER 24 Spout and 12 Spout Stainless Steel Rotary Vacuum Fillers.
CAPEM 4 Head Fully Automatic Capper.

WANTED

Single Machine or Entire Plants

ALLIED EQUIPMENT CO.

940-946 Nepperham Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

For 1952

"CONSOLIDATED'S"
GIFT TO ALL INDUSTRY:

IMMEDIATE DELIVERY

3—42" All Stainless Steel Centrifugals, Amer. T.&M. Co., each with s/s basket, curb, casing, shaft, unloader and 40 H.P. variable speed Slip Ring 3/60/400 v. 1200 rpm. motor with full controls. Suspended bottom discharge type. Now at Newark.

1—6'x50' Louisville welded shell Rotary Steam Tube Dryer, 2 rows, 54 tubes.

8—Oliver Vacuum Filters, incl. 8x12', 11'6x14', 11'6x18'.

8—8'x12' All Stainless Steel Feinc Rotary Continuous Vacuum Filter, string discharge, with blankets and Stainless Steel trough, repulper, receivers, vacuum pump, motors, reducers, etc. Shop #387

1—4'x30' Stainless Steel lined Rotary Dryer, reducer and 10 H.P. motor.

1—18"x28" Bird Continuous Centrifugal Stainless Steel, copper housing, with 10 H.P. motor.

4—Swenson-Walker Jacketed Crystallizers in 10' sections, (1—70' lo. and 3—80' lo. each with pulley driven gear reducer, 10 H.P. A.C. motor). Units 24" I.D. x 26" high, with 3/8" steel plate and 1/4" steel jackets, steel covers, ribbon agitators.

1—H.P.M. Co. 500 Ton Curb Press, 24"x36" curb, with steam pump.

1—Mechanical 5'x16' jacketed Cooker or Dryer.

3—Steel 9500 gal. closed jacketed agitated Kettles.

2—500 gal. open s/s jacketed Kettles, one agitated.

2—Rotex Sifters, 40x84"; #11 20x48"; Day #71 Stainless Steel "Roball" Sifters, single deck, 40"x84, with 2 HP, 3/60/220 volt motors.

2—Mikro Pulverizers, #1 with 7½ H.P. motor and #2 Type 2W.

6—Mixing Tanks; 10'x7', with steam coils and agitators.

1—30"x30" Aluminum Filter Press, 45 Chambers; 1—24"x24", 24 Chambers.

1—150 Gal. Jacketed Aluminum Kettle; 4—100 gal.; 10-80-60-40-20 gal.

1—24" x 24" Plate and Frame Aluminum Filter Press, 24 Chambers.

Only A Partial List

CONSOLIDATED
PRODUCTS CO., INC.
13-17 PARK ROW
NEW YORK 38, N. Y.
BArclay 7-0600

WE BUY YOUR SURPLUS MACHINERY

FOR SALE FROM STOCK

8—3000 gal. Horiz. Demountable Stainless Steel Truck Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.

1—2000 gal. Hori. Stainless Steel Truck Tank, insulated.

1—Illinois Water Treating System, 500 GPH low-rate, complete with Zeolite tank.

2—Lee Stainless Steel Jacketed Kettles, with double motion agitators, 250 gal., 125# jkt.

70—Stainless Steel and Stainless Clad Jacketed Kettles, 10, 40, 60, 80, 100, 150, 500 gal.

35—Stainless Steel Tanks, 30, 50, 60, 100, 150, 300, 400, 500, 900, 1000, 1400, 3000, 3500 and 5700 gal.

1—100-gal. T347 Stainless Steel Pressure Tank, 250# Pr., Elec. heated.

5—Aluminum Tanks, closed, 500, 1100, 1350, 1485 gal.

18—Horizontal Glass Lined Steel Tanks, 7500 & 8250 gal.

1—Manton Gaulin 125 CGD Homogenizer, stainless steel—unused.

6—Powder Mixers, 50#, 100#, 200#, 400#, 2000# 2400#.

4—Selectro Stainless Steel Vibrating Screens, two-deck, 2' x 7', enclosed.

10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.

2—Triangle G-2-C Elec-Tri-Pak Weighers & Fillers.

2—Elgin Auto. Twin Piston Fillers.

1—M R S 8 spout semi-automatic Vacuum Filler.

1—International 12 spout automatic Vacuum Filler, Stainless.

2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.

1—Feinc Rotary Vacuum Filler, string discharge, 4'6" dia. x 6', aluminum.

2—Sweetland Filters, #2 & #5.

10—Distillation Columns, aluminum, copper, steel.

1—Fitzpatrick "D" Comminuting Machine, Stainless Steel.

PERRY EQUIPMENT CORP.
1411 N. 6th ST. PHILA. 22, PA.

HERE'S FOOD FOR THOUGHT

We have available many desirable items for the food and process industries.

We also purchase from individual items to complete plants.

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway GRamercy 3-5880 New York 12, N.Y.

FOR SALE

3—2000 GALLON CHERRY BURRELL

Stainless Steel lined horizontal, cylindrical storage tanks with agitators and 3" cork insulation.

HERSHEY CREAMERY COMPANY
Box 121, Harrisburg, Penna.

VALUES *"BUY BRILL"*

2—Bowen and Rogers 16' dia. Spray Dryers.
2—Oliver 8'x10' Monel Rotary Vacuum Filters.
1—Feinc 8'x12' Steel Rotary Vacuum Filter.
9—Oliver Rotary Vacuum Filters 3'x4', 8'x8', 8'x12', 11'0"x14'.
1—Vallez 2'8 Filter, 41 S.S. covered leaves.
1—Allbright-Nell 60"x80" Flaker.
2—Buflovak 32"x100" Atmospheric Double Drum Dryers.
1—Link Belt Roto-Louvre Dryer 11'6"x35'.
1—Link Belt Roto-Louvre Dryer 2'7"x8', monel.
1—Tolhurst 32" Suspended Centrifugal, monel perforated basket, bottom discharge, m.d.
1—Fletcher 40" Suspended Centrifugal, stainless perforated basket, bottom discharge, m.d.
2—Tolhurst 48" Center Slung Stainless Steel Centrifugals.
2—#7 Sweetland Filters, 27 leaves, 3" c.c.
4—Shriver 30", 24", 18", 12" P&F Filters.
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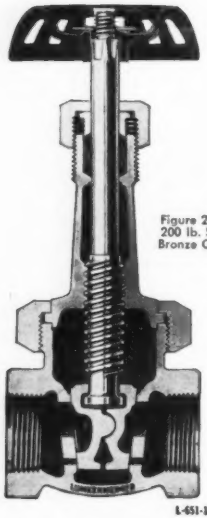

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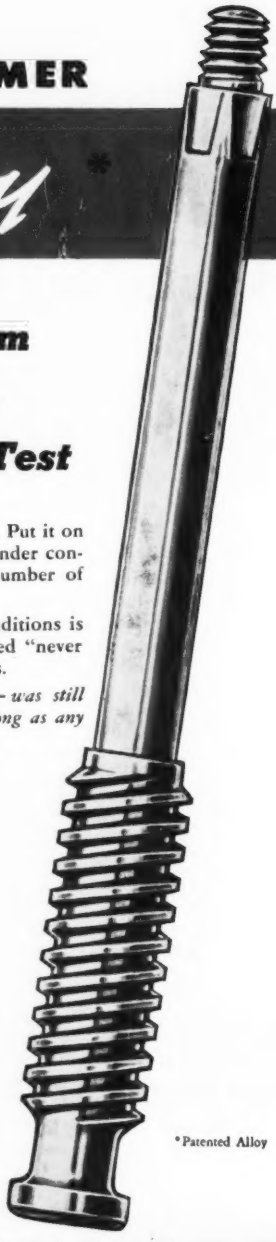
L-451-H



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WHAT THE NUMBERS MEAN

Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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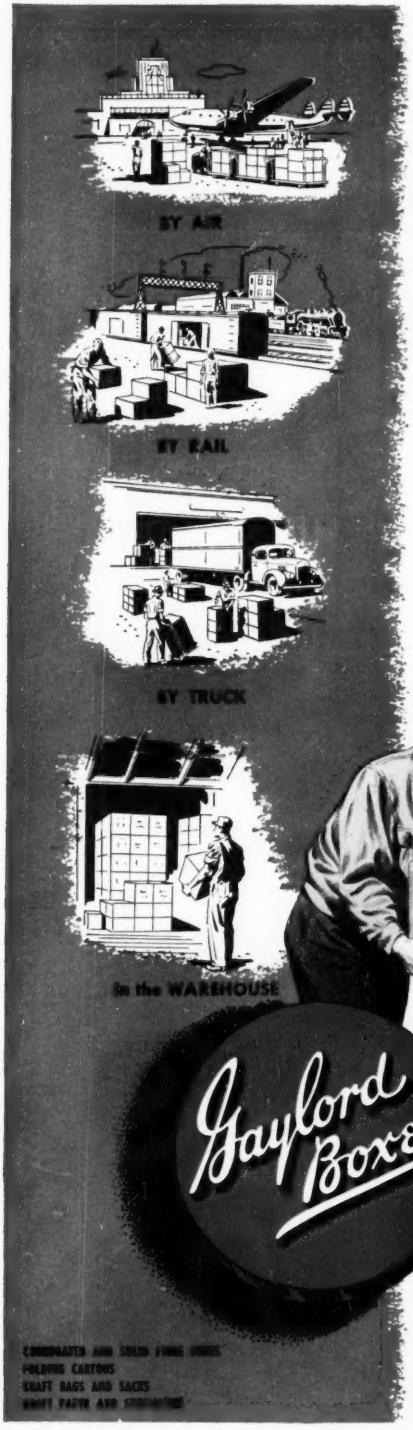

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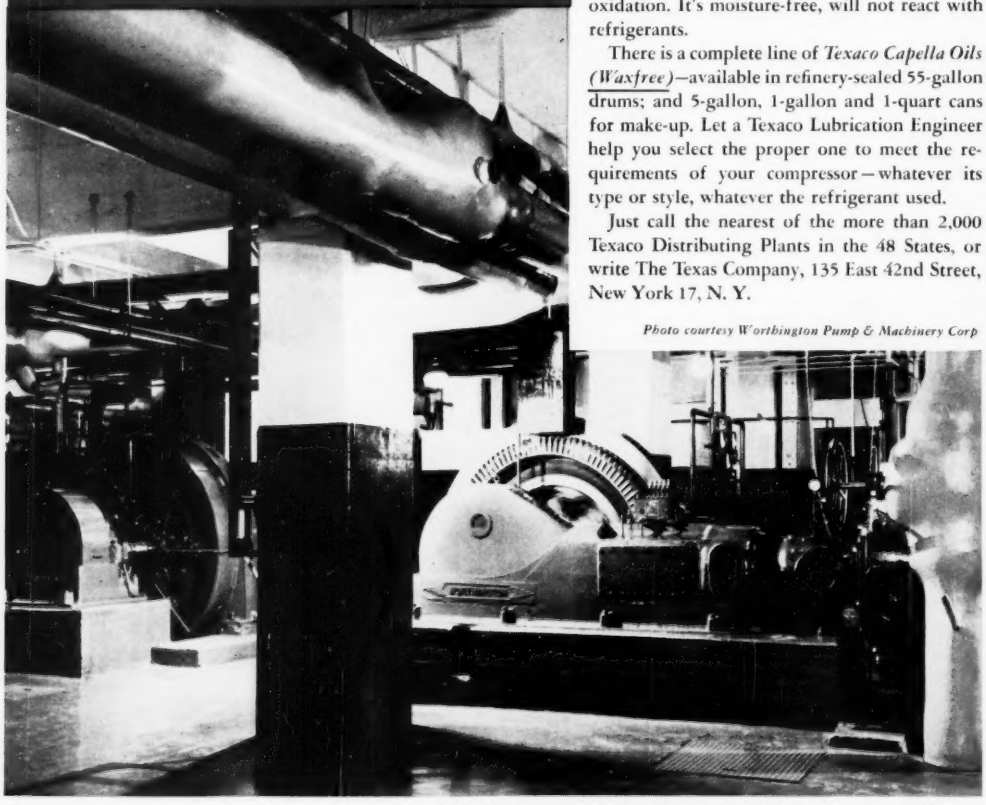

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